

The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

VOL. XI. No. 281

NOVEMBER 1, 1924

Prepaid Annual Subscription
United Kingdom, £1.0; Abroad, £1.4.6.

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NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

The prepaid subscription to THE CHEMICAL AGE is 21s. per annum for the United Kingdom, and 26s. abroad. Cheques, Money Orders and Postal Orders should be made payable to Benn Brothers, Ltd.

Editorial and General Offices—8, Bouverie St., London, E.C.4.
Telegrams: "Allangas, Fleat, London." Telephone: City 9852 (6 lines).

Chemicals at Wembley

THE great Empire Exhibition at Wembley, which was opened on April 23, closes to-day. It will be remembered as a public-spirited enterprise which, though it may leave a balance on the wrong side, has proved in all its main objects an impressive success. That such a demonstration of the resources of the Empire should have had no representation of the British Chemical Industry would have been a discredit and a disaster. In point of fact, chemical science and industry have been represented by one of the best sections of the Exhibition. For this satisfactory situation we are indebted first to the initiative of the Association of British Chemical Manufacturers, who have admirably discharged the heavy task of general organisation, and secondly to the loyalty and public spirit of individual chemical firms, who have gone to the considerable trouble and cost of exhibiting their products and maintaining a staff of attendants over a period of six months. It was a piece of public work which needed to be done for the industry and which has actually been done in a way that can be looked back on with real satisfaction.

In attempting to estimate the results, it must be remembered, first of all, that in this sort of work the greatest results are often of a kind that cannot be tabulated. The Chemical Section was primarily a

demonstration of the vitality of the British chemical industry and the range of its productive capacity. It showed us to be a nation of chemical manufacturers, and disposed of the fallacy that we are only distributors. Secondly, its effect was intended to be educational—to the trade, to the public, and especially to our numerous visitors from overseas. Thirdly, it was a co-operative effort, aiming at a broad collective effect; quite the opposite of a mere shop-keeping adventure or a national sales campaign, to be judged by the business done over the counter. In all these larger aspects the Chemical Section has been a thorough success, and all who have co-operated in securing that success are entitled to recognition and thanks.

On another page we publish some internal impressions from chemical exhibitors themselves. These constitute only a proportion of the total, but they are interesting and in some respects very encouraging. If they had been unanimous in saying that all their hopes had been realised we might have suspected their replies of being merely conventional compliments. The fact, on the contrary, that they are not unanimous, that they judge of the results from different points of view, that their satisfaction with results is tempered with critical discrimination, increases their real value. What in effect do their reports come to? Those who realised the primary purposes of the Exhibition have no doubt as to its having completely fulfilled its purpose. Those who only partially realised its purpose are satisfied on some points, a little dissatisfied on others. Those who mistook the Exhibition for an order-book organisation are disappointed to the extent that they misread its real aims. One of the most encouraging features of the replies is the evidence of the educational effect of the Exhibition on the exhibitors themselves and of the steady development of a better understanding of the real meaning of "publicity."

Some Points on Neutral Sulphate

At a recent meeting in the North of England, Dr. Geoffrey Weyman expressed the opinion that if it is worth while manufacturing sulphate of ammonia it is worth while neutralising and drying it. This is an axiom with which few will be disposed to disagree, yet we still seem to be some little distance from the goal which the British Sulphate of Ammonia Federation is so insistent in its effort to attain, namely, a 100 per cent. output of neutral salt. There is, however, no reason for despondency, for the past few years have witnessed a progressive improvement, and possibly there is some logic in the contention of the "acid" school that so long as there are consumers and merchants who will take, even ask for, an unneutralised

salt, then so long there is no direct incentive for producers to change their methods. It would, perhaps, be thought that the difficulties in handling the old acid material would be sufficiently self-evident to justify a change, particularly as the additional capital cost and operating charges need be only very small in comparison with those associated with the rest of the plant.

In spite of the past few years' experience, minor difficulties and temporary derangements are still likely to occur during the process of neutralisation and drying, but Dr. Weyman let fall some useful suggestions which sulphate manufacturers would do well to study. Generally speaking, the free acid in centrifugal salt runs from 0.15 per cent. to 0.50 per cent., though in exceptional circumstances it may be much higher. With a salt of definite crystal grain and—an important point—of even texture, containing little or no fine particles, the acidity will be about 0.25 per cent. The problem, then, is to distribute an alkali so as exactly to neutralise this free acid without interfering with the texture or character of the salt. Any alkali may, of course, be used, and the distribution of the alkali is materially aided by ammonia gas which is liberated either from the neutralising agent added or by decomposition of the sulphate by the agent. At the present time, as Dr. Weyman says, purity of salt has such a commercial value that the use of ammonia in some form or other is to be preferred. In distributing the neutralising agent, however, although the centrifuge appears to be the best means, a difficulty arises from the fact that a solution added during centrifuging passes upwards and out at the top of the basket, and an acid portion remains near the bottom. This necessitates leaving a sufficient excess of alkali to neutralise this portion when the salt is discharged; and in some cases where the salt is fine grained it has been found impossible to do this even when using strong solutions of ammonia. On the other hand, if the agent is added after the centrifuge, it becomes necessary to use some mechanical device for mixing the salt and the neutralising agent, and it is difficult to do this adequately without damaging the texture of the salt. When the salt is cold it is more difficult to neutralise evenly; and if external heating is adopted it is not easy to avoid premature decomposition and loss of ammonia. The main point to bear in mind would seem to be the influence of texture on the final result, while there is also the question of ensuring homogeneity of the effect so that patchiness, which without careful testing is difficult to trace, is not taking place unknown to the operator.

The Slump in Ferrocyanide Prices

THOSE who were present at the recent annual meeting of the British Cyanides Co. must at least have gone away with the satisfaction of knowing that the undertaking has pulled through a crisis which many would have failed to withstand, and there is good ground for supposing that the future promises some great improvement from the new developments which the company has now in hand. The uncertainties of trading conditions, even when somewhat specialised substances are concerned, is well illustrated when one recalls the optimistic spirit in which Mr. Kenneth Chance ad-

dressed the shareholders some fifteen months ago. At that time the company appeared to have a most promising future before it, and it is to be hoped that it will quickly recover from the set-back it received from the wholly unexpected and quite unprecedented fall in value of certain cyanide compounds. The situation was one which certainly could not have been foreseen, and Mr. Chance has lucidly explained how it arose from the entry into the field of an American undertaking which, protected by heavy tariffs, has been able to capture practically the whole of the American market and to compete with European producers in the other markets of the world.

A glance at the prices ruling for cyanide products during the past few years is sufficient to illustrate the débâcle which has occurred. If, for instance, sodium prussiate is taken, it will be found that in July, 1920, it was fetching about 1s. 8d. per lb. In July last year the price was 7d., while at the commencement of this year it was 6d., and at the moment it ranges round 4d. In other words, ferrocyanides are to-day selling at pre-war prices, and obviously under present conditions there is no profit in them. Another side of the question is the situation as it affects the gasworks, who are the main producers of the sulphocyanides which are ultimately converted into ferrocyanides. The process of recovering cyanogen compounds from coal gas does not at the best of times leave much margin for profit, and it is to be noted that the gas undertakings, recognising the difficulties of the situation, have agreed to accept prices (for their sulphocyanides) which are lower than have hitherto been paid.

It is not altogether easy to see in what way any improvement can be looked for in the way of prices, for the supply has definitely exceeded the demand, and there is no great likelihood of any marked increase in the consumption of cyanides unless new outlets are disclosed. Possibly, however, Mr. Chance knows more about the prospects in this last-named direction than he has thought wise to disclose, for he spoke in hopeful terms of some new organic compound which his chemists have succeeded in producing from sulphocyanide, and which is likely to find a considerable market in connection with the vulcanisation of rubber and in many other directions.

Improving Industrial Processes

THE organisers of the meetings of the Chemical Engineering Group are to be congratulated on having added last week another successful conference to the number already held on practical problems in the chemical industry. The secret of success in meetings of chemists, who may individually be interested in specialised problems of little interest to anyone else, is to select a subject of broad general interest. Such subjects as have been chosen in the past by the Chemical Engineering Group fulfil this condition exactly—very few chemists indeed have no practical connection with standard processes such as filtration or evaporation. The selection of papers on different aspects of the chosen subject again ensures wideness in the appeal. At last week's meeting Mr. T. V. Barker's paper seemed at first sight to be poles removed from Mr. Hugh Griffiths's contribution, but they proved when the time came for discussion to have many points of

contact. The paper on the theoretical aspects of crystal formation by Mr. Barker, who is virtually in fact, though not in name, professor of crystallography at Oxford, appeared to be rather remote from practical matters, until he delivered his exposition at the meeting, when it was clear that there were a number of points of industrial significance. Mr. Griffiths, in his paper, and many speakers in the discussion afterwards, dealt with the practice of various firms in a satisfactorily open way when it is considered to what a great extent the idea of secret processes still persists in this country. Mr. J. A. Reavell made a half-humorous, but nevertheless sincere, plea for the full discussion of details of operation, thus emphasising one of the characteristic features of the Group's meetings, in which there is always a tradition of open discussion. Mr. Reavell appears to think that they can go farther yet in this direction, and there is no doubt that processes can be quite fully described by responsible plant chemists without giving away essential secrets. A single isolated fact mentioned in this way may suggest a valuable idea of use in quite another field. If this free interchange is mutual, then it acts obviously in the direction of greater all-round efficiency and assists in the advancement of science.

Mr. Griffiths's paper showed, among other things, the effect of the application of common-sense scientific methods to a problem which has usually been tackled on an industrial scale by rule-of-thumb. By carefully investigating the conditions favouring the formation of regular crystals it has been possible to devise a machine which will produce them automatically from substances which crystallise by cooling the solution. At the same time there is a large and continuous output. If this method of controlled crystallisation is capable of producing crystals of different sizes to suit users' ideas to order, as it would appear to be able to do, it will clearly be of great value to the industry. It is likely that attempts may be made to produce other devices for automatic crystallisation, so that Mr. Griffiths was justified in withholding some of the details at the present time, and thus satisfying the requirements of both science and commerce.

The Election

THE results of the General Election already declared make it clear that one difficulty present in the last parliament will be removed. The Conservative Party will be in a majority over both Labour and Liberals, and the Government will therefore be not only in office but in power. The results, so far as candidates connected with the chemical industry is concerned, are interesting. The sitting members re-elected include Sir Alfred Mond, Sir William Alexander, and Dr. G. C. Clayton, and on business grounds their presence will be appreciated by all parties. The defeat of Sir John Brunner at Southport will be generally regretted, and the loss is emphasised by the failure also of his son, Mr. F. J. M. Brunner, in the Hulme Division of Manchester. Sir Alfred Mond's son, who represented the Isle of Ely, has also failed to retain the seat. Mr. T. Miller-Jones (Stepney) and Mr. E. Brotherton-Ratcliffe (South Islington) are unsuccessful for the second time. Lieut.-Commander

Astbury has recovered his seat at West Salford, but Major A. G. Church has been defeated at East Leyton and Mr. H. Hogbin at North Battersea. Against a series of Liberal losses may be placed the signal success of Capt. Wedgwood Benn, returned for Leith by a majority of 5,000.

Points from Our News Pages

- We publish this week impressions of exhibitors in the Chemical Section at Wembley as to the results of the exhibition (p. 440).
 The Chemical Engineering Group held a successful conference on Industrial Crystallisation Problems in London (p. 442).
 The annual meeting of the B.A.C. was held this year in London and was followed by a very successful dinner (p. 445).
 Our Metallurgical Section this month contains articles on "The Arrangement of an Ideal Steelworks" and on "Copper Smelting with Calcium Carbide."
 Our London market report reveals quite active business during the week and the possibility of a considerable trade revival (p. 452).
 Our Scottish market report shows no change and the heavy chemical market remains quiet (p. 455).

The Calendar

Nov.		
3	Institution of the Rubber Industry (London Section): "Gutta Percha: Preparation and General Properties." C. W. H. Howson.	Engineers' Club, Coventry Street, London, W.
3	Royal Institution: General meeting. 5 p.m.	Albemarle St., Piccadilly, London.
3	Society of Chemical Industry (London Section): "Experiments in Protection." W. J. U. Woolcock. 8 p.m.	Burlington House, Piccadilly, London.
3	University of Birmingham Chemical Society: "The Application of Science to the Production of Gems." J. R. Dolphin. 5.30 p.m.	Chemical Lecture Theatre, Edgbaston.
4	West Yorkshire Metallurgical Society Discussion on "The Influence of Casting Temperatures on the Physical Properties of Non-ferrous Alloys." 7.30 p.m.	George Hotel, Huddersfield.
4	Institute of Metals (N.E. Coast Section): "The Structure of Metals in its Relation to Elastic Failure" Part II. W. E. W. Millington. 7.30.	Armstrong College, Newcastle-on-Tyne
5	Society of Chemical Industry (Nottingham Section): "The Testing of Bates in the Laboratory." C. E. Pickard. 7.30 p.m.	University College, Nottingham.
5	Society of Public Analysts: 8 p.m.	Burlington House, Piccadilly, London
6	Chemical Society: Ordinary Scientific Meeting. 8 p.m.	Burlington House, Piccadilly, London.
6	Society of Chemical Industry and the Institute of Chemistry (Bristol Section): "The Present Position of the Geber Problem." E. J. Holmyard. 7.30 p.m.	The University, Woodland Road, Bristol.
6	Finsbury Technical College: Streatfield Memorial Lecture. "The Chemist and the Fermentation Industries." Julian L. Baker. 4 p.m.	Leonard Street, City Road, London.
6	Royal Society: Papers by T. R. Morton, W. L. Bragg, O. W. Richardson, T. Tanaka and J. D. Bernal. 4.30 p.m.	Burlington House, Piccadilly, London.
7	Society of Chemical Industry (Manchester Section): Joint meeting with the local sections of the Institute of Chemistry, the Society of Dyers and Colourists and the Manchester Literary and Philosophical Society. "The Influence of Chemical Research on Medicine and Forensic Medicine." Sir William Willcox. 7 p.m.	The Textile Institute, 16, St. Mary's Parsonage, Manchester

Results of the British Empire Exhibition

Impressions of Chemical Exhibitors

This article contains a number of opinions on the Chemical Section at Wembley contributed by chemical exhibitors, together with some comments on the views expressed.

THE British Empire Exhibition at Wembley closes to-day (Saturday). It has been a wonderful demonstration of the resources of the British Empire, and its educational effect has far exceeded all precedents. It will be a satisfaction to all friends of British Chemical Industry to look back on the prominent place which British chemical science and industry occupied in the Exhibition. The Chemical Section, so well organised by the Association of British Chemical Manufacturers, was admittedly one of the most attractive and best-arranged sections of the Exhibition. Deliberately designed for educational and publicity purposes, not as a mere trade fair, it is nevertheless reassuring to have so many testimonies to its directly beneficial influence. The results, however, must be looked for more in the future than in the present. They may come, as the results of well-organised publicity generally do, in indirect and unexpected ways, but in the end they will more than repay the cost and effort entailed.

It seemed a pity to allow so notable an experiment as the Chemical Section to pass without some expression of opinion from the chemical exhibitors themselves of the results attained. We therefore addressed to them recently a circular inviting their views on the following points:—

1. Has the Chemical Section justified itself from the Exhibitor's point of view?
2. What are its results in actual business or in business inquiries?
3. What has been the effect upon visitors, especially overseas visitors?
4. In the event of the Exhibition being reopened next year, would you favour another Chemical exhibit?

The replies, though they only represent a proportion of the exhibitors, are interesting. It may reasonably be expected that those who are disappointed would be the readiest to state their views. As a matter of fact, disappointment is much less prominent than satisfaction, and where it exists it is due to a mistaken impression of the real spirit and purpose of the Chemical Section and of the Exhibition as a whole. The most encouraging feature of the replies is the evidence they afford of the growing understanding among exhibitors themselves of the real meaning and objects of a publicity campaign, and the excellent educational effects which the Exhibition has had in this direction.

From the replies received we have selected the following as fairly representative. It is interesting to note the variation in the points of view, and the different forms in which the advantages of the Exhibition have impressed themselves upon different exhibitors.

Exhibition Justified

The British Dyestuffs Corporation, one of the largest exhibitors in the Chemical Section, write:

1. Yes. Had we been showing as an individual firm, and not as part of the Chemical Section, the results obtained from the Exhibition would have been less than have been obtained.
2. As regards actual business, the results have been very small indeed, so far. As regards business inquiries, the results have been fair.
3. The exhibit has been of considerable interest, but as to whether it has had any permanent effect it is impossible to say.
4. We are not in favour of participating in the Exhibition again next year, should it be reopened.

The report of John and E. Sturge, Ltd., may be taken as typical of the firms who grasped the essential purposes of the Exhibition:—

1. Speaking generally, we think the Chemical Section at the Exhibition has justified itself from our point of view.
2. The results in actual business are not large at present, although they may prove of value. Business inquiries directly due to the exhibit have been very few.
3. We have very little means of judging what the effect upon visitors has been, but no doubt our exhibit has kept our name before interested people, and may bring further inquiries.
4. We do not think the Exhibition, if reopened next year, would be complete without a Chemical exhibit.

A Demonstration of British Chemistry

Much in the same spirit and to the same effect is the reply from the Graesser-Monsanto Chemical Works, Ltd.:—

1. The Exhibition was essentially a demonstration of the British Chemical Industry's position, strength, and possibilities. If this is taken as our point of view, the Chemical Section was fully justified.
2. Results in actual business or inquiries are negligible, but such immediate results were not expected from this Exhibition, as far as our lines go.
3. Visitors to the Chemical Section could not help but be impressed by the enterprise shown by all exhibitors, and overseas visitors especially must have carried away a lasting picture of the vast resources available, and the ability of the Chemical Industry to fill all requirements.
4. In not favouring another exhibit on our part, we feel that the purpose of the Chemical Section as a combined proof of British endeavour and service to "an Empire worth working for" has been achieved.

"Has Justified Itself Fully"

The good results are well summarised in another way by Stafford Allen and Co., Ltd.:—

1. We certainly think the Chemical Section has justified itself fully, and has convinced those who visited it that England can hold its own against competition.
2. Practical results are, of course, different from different points of view. In our case, being a purely wholesale firm, we did not expect many direct orders, but we have been rather disappointed that more overseas buyers did not come to place business. As a means of advertising it is rather an expensive experiment, but possibly worth the outlay.
3. We think the general feeling of visitors was that the Chemical Section was larger and more comprehensive than they had anticipated.
4. We think the Section should take a modified form as we ourselves, and we think many others, would not be prepared to exhibit to the same extent.

"A Plain Duty"

It will be seen that Newton, Chambers and Co., Ltd., think the organisation of the Chemical Section was a plain duty and favour another exhibit next year:—

1. We did not anticipate that our exhibit in the Chemical Section would have any considerable or immediate effect on business, although we had hoped to have a considerable number of business inquiries.
2. Generally speaking, the results do not appear to have come up to the minimum we had hoped for, but we still consider, as we have from the first, that it was a plain duty of industrial concerns to support this great trade effort, especially with a view to impressing overseas visitors.
3. The costs and the trouble involved in the management of the exhibit have also exceeded expectations, but this is usually the case with exhibitions and requires to be borne

in mind when considering the next year's effort. On the whole we are in favour of another Chemical exhibit if the Exhibition is reopened next year.

The reply of Boots Pure Drug Co., Ltd., is favourable on all four points:—

1. It is very difficult to say, but we believe it has.
2. Very little actual business transacted, but many useful inquiries that should develop into business.
3. Generally good.
4. Yes, provided fine chemical and pharmacological exhibits are dissociated from toilet preparations, boot and metal polishes, and similar products.

'Very Good, Indeed'

So is that of the Keystone Varnish Co., Ltd., except that they are not so favourable to reopening next year:—

1. Yes.
2. Very good, indeed.
3. Very interested, particularly Australian Commissioners and overseas customers.
4. No. We do not think any further advantage would be derived, and the constant attendance is too much of a strain.

A More Critical Estimate

Here is a useful critical opinion from Burt, Boulton and Haywood, Ltd.:—

1. The answer to this question is governed by the point of view. The point of view of a retailer's business must of necessity be different from that of wholesalers like ourselves. It is probable that the Chemical Section has done a great deal for the trade as a whole. From the individual point of view of a wholesaler, it is probable that no very material advantage will accrue, but it is well-nigh impossible to gauge the results before several years have passed. Advertising costs money, and it remains to be seen whether the publicity obtained through the Exhibition is likely to prove remunerative or the reverse.

2. Our stand has aroused considerable interest among visitors, but naturally our business, being of a wholesale nature, does not draw the same attention from the crowd as the retail business and we have not had large "spot" sales.

3. We have had a certain number of genuine inquiries of a general nature, and we have distributed information and given quotations to potential buyers throughout the Empire.

4. Generally speaking, we agree that if other trades are represented the Chemical trade cannot afford to be absent, but before giving a reply to your question as put we prefer to wait until we have more definite information as to the scale of charges and conditions of exhibit in the event of the Exhibition being reopened next year. We are in favour of a series of joint exhibits, organised and controlled by the A.B.C.M., in which groups of chemical manufacturers are represented.

A Possible "Good Advertisement"

The reply of Thomas Tyrer and Co., Ltd., is an open-minded expression of opinion, which recognises that though immediate results may be small the ultimate effects may be considerable:—

In reply to your questions 1 and 2, we hardly like to say. As far as our own experience is concerned and from the remarks by a few of our friendly competitors we doubt whether the Chemical Section has justified itself for there has been very little result in our own case up to the present as far as we can see, but one can hardly say what may result in the future. It may have been a good advertisement, although without bringing immediate business or inquiries, but the after-effects may be very different—this remains to be seen.

Regarding question 3, we can hardly say as to the effect on the visitors. As far as we can judge there were constant visitors at our stand, but possibly more because it looked pretty than a matter of chemicals.

As to question 4, and whether we should have another Chemical exhibit if the Exhibition should be reopened next year, it would all depend upon arrangements. If the cost is going to be the same as the cost this year, as far as we are

concerned our opinion will be against it. We think it is generally agreed that the cost for the exhibitors was enormous, and we fail to see why it should be anything like it next year for the cost already has been very great. Next year there will be very little expense for the authorities, comparatively speaking, compared with this year, and we therefore think if the Chemical Section is opened again next year they should allow the folks who have had a stand this year to retain their allotment and stand for a mere nominal sum which might be regarded as rent and this should pay them very well as it would be all clear profit, and the exhibitors, of course, could do up their own stand and thus it would become much cheaper. However, if it is going to cost as much as this year we should certainly be against it.

The firm of C. R. Averill write briefly:—

While we have undoubtedly secured a large number of business inquiries it is indeed very difficult to estimate at the present time as to what actual business will result. We expect that it will be some time before we can state whether this Exhibition has paid for itself as far as we are concerned.

Strong and Weak Points

Some of the replies frankly express disappointment at the results, but these are mainly cases where the exhibitors expected to do a considerable volume of business. Spencer, Chapman and Messel, Ltd., after explaining that their exhibit was in an enclosed showcase and the stand unattended, add:—

The number of inquiries put into our inquiry box has been very small and we are unable to trace any direct business accruing from our exhibit. We should mention, however, that our main object in exhibiting was to keep our name before visitors to the Chemical Section.

The Midland Tar Distillers, Ltd., while hardly thinking that the Chemical Section has justified itself from a business point of view, recognise that "probably the effect from a national point of view will be far-reaching"—which would, indeed, be the greatest justification that could be wished. Exhibitors who are at present disinclined to exhibit next year, unless the conditions are altered, include John and James White, Ltd. (who, however, add that the Chemical Section "has had a fine influence from an educational point of view"), B. Laporte, Ltd., Hickson and Partners, Ltd., and J. C. Bottomley and Emerson, Ltd.

Soap Manufacturer's Failure

THE first meeting of the creditors of William Howarth, soap manufacturer, of Bradley Fold, near Bolton, Lancashire, was held recently at the Official Receiver's offices, Byrom Street, Manchester. The statement of affairs showed gross liabilities £1,121, and a deficiency of £881. Debtor attributed his position to bad trade, coupled with the action of the Bolton Corporation in prohibiting his carrying on trading in a certain locality. In 1918 he commenced business as a soap manufacturer without capital at Bolton, continuing successfully until November, 1920, when his business was stopped by the Corporation. In November, 1921, he recommenced at his present address and was fairly successful in 1922, but trade declined considerably during 1923 and 1924. The matter was left in the hands of the Official Receiver as trustee.

A Deal in Turpentine

BEFORE Mr. Justice Rowlatt in the King's Bench Division, on Tuesday last, C. T. Bowring, Ltd., of Liverpool, brought an action against F. L. Giddings, of Great James Street, London, to recover £271 12s. 7d. balance, which they alleged was due to them on the sale of 100 barrels of turpentine. There was no defence. Mr. D. Davies, for Messrs. Bowring, said in 1923 plaintiffs purchased the turpentine on behalf of Giddings, who refused to take delivery. The turpentine was resold at the prevailing market price and this resulted in a loss to Messrs. Bowring of £271 12s. 7d., the amount of the claim. Mr. Justice Rowlatt entered judgment for Messrs. Bowring for the amount claimed.

Problems in the Industrial Manufacture of Crystals

Conference of the Chemical Engineering Group

At a meeting of the Chemical Engineering Group of the Society of Chemical Industry, at the Engineers' Club in London, on Thursday, two papers were presented on crystallisation problems. One of these was by Mr. T. V. Barker. This, entitled "The Development and Formation of Crystals," reviewed the relationships between crystal form and the arrangement of the atoms in the space lattice as revealed by X-ray investigations. The other paper, by Mr. Hugh Griffiths, B.Sc., M.I.Chem.E., dealt with "Mechanical Crystallisation," and a summary of this is given below.

ALTHOUGH crystallisation is practised in nearly every chemical works, comparatively little has been known of the exact mechanism of crystallisation processes, and the methods followed in many chemical works at the present time must be extremely old.

Of the few researches carried out on the dynamics of crystallisation practically none is of interest to the chemical engineer. It is not surprising to find therefore that crystallisation on a large scale is in many quarters regarded not as a science, but more or less as a craft, and in practice a matter in which tips and dodges are more important than scientific knowledge.

Most of us will remember being told that in order to secure good crystals the solution must be cooled very slowly and on no account subjected to any kind of mechanical disturbance during the process, and also how, even when the instructions were followed most carefully, often the desired beautiful crystals were not obtained. Nevertheless, we believed that these failures were due to some obscure disturbance, and have believed ever since that stationary solutions and slow cooling will give good crystals of large size, and, conversely, that rapid cooling and agitation would invariably yield small granular crystals. This belief, however, is founded on insufficient data, and on experience of crystallisation over a very limited range of conditions, and, as a generalisation, should not be accepted.

Careful investigation has shown that if the conditions of super-saturation are correctly adjusted, agitation or motion of the solution has no effect on crystal growth, and so far from motion being detrimental to the regular growth of crystals, in most forms of apparatus motion actually takes place and is beneficial. The agitation, if sufficiently violent to cause attrition of the crystals, will produce new centres of crystallisation, and it is only in this sense that agitation may be considered as detrimental in the production of large crystals.

The rate of cooling or rate of increase of super-saturation which may be produced either by cooling or by evaporation, has under certain conditions an influence on the progress of crystallisation.

Crystallisation in Stationary Vessels

It is fairly safe to say that at the present time the commonest process of crystallisation is that in which stationary vessels are used, these being cooled simply by contact with the air and more or less by diffusion of moisture into the atmosphere from the liquid surface. Whilst skill and experience in the use of such vessels may account for much, the practice is almost entirely empirical and surrounded by superstitions.

The art of crystallisation in stationary vessels consists simply in adjusting the temperature and concentration of the solution to suit the particular size of vessel and surrounding temperatures, so that the minimum proportion of bottom crystals is obtained. Until the crystallisation is finished convection currents are always present in the solution, and the formation of the steadily grown crystal at the side seems to be dependent upon these convection currents.

It is only in comparatively recent years that any attempt has been made to adopt more scientific methods of crystallisation, and in many chemical works the moment a crystallising process comes for consideration the stationary vessel is installed without question, perhaps because it is cheap. As will be realised, however, it is not cheap to operate, and in addition frequently the saving in capital cost is more than counterbalanced by the enormous stock of material which has to be carried in process.

Properties of Crystallising Solutions

From the chemical engineer's point of view the most important contributions to our knowledge of crystallising solutions have been made by Miers and his collaborators. After referring in detail to some of these experiments, the

speaker pointed out that determinations of rate of crystal growth are rather difficult to carry out, and from experiments which have been made by the writer with inorganic materials, it would appear that the influence of impurities is very great, but two results stand out very clearly—namely, that the rate of crystal growth is dependent upon the degree of super-saturation, but the influence of increase of temperature in raising the rate of crystal growth is usually very much greater than the influence of concentration. At any given temperature and degree of super-saturation the rate of deposition of material on a crystal surface is perfectly definite. It will be clear, therefore, that if we are crystallising, the rate at which we can cool the solution or remove solvent by evaporation without getting into the unstable region will depend upon the amount of crystal surface presented to the solution during the passage of the conditions through the metastable region. It is very important that the amount of crystal surface presented to the solution shall be adequate. The ideal crystallising plant for producing grown crystals is therefore one in which the area of crystal surface per unit volume is a maximum and one in which the rate of cooling or removal of the solvent can be adjusted so that the solution does not reach the unstable region at any time. If during the progress of a crystallisation the solution reaches the unstable conditions, it will be seen that the crystallisation is quite out of control, the separation of new crystal centres takes place, and as most substances crystallise with evolution of heat, the process may actually become oscillatory.

Applications of Crystallisation Processes

Before any attempt is made to classify mechanical crystallisation plants it is well to consider what objects may be in view, as these will naturally influence the choice of apparatus. The objects of a crystallisation process as applied to any given manufacture may be:

- (a) The removal of a dissolved substance from solution.
- (b) The removal of a dissolved substance from a solution containing other materials, *i.e.*, separation or purification.
- (c) The removal of a dissolved substance from solution in a specially marketable form, *i.e.*, production of some special grade of crystals.

The two first crystallisation processes usually have for their object simply the separation of the materials from the solutions without regard to the crystal size or shape. In such cases the best plant is obviously the one which enables the process to be accomplished with the minimum of trouble and equipment.

The third class of crystallisation process is that in which the object is to produce the materials in some special marketable form. It has been known to chemical manufacturers that certain classes of customers are always prepared to pay higher prices for clear, clean and regular crystals as distinct from broken up agglomerated crystal masses. In the older chemical works where crystallisation in stationary vessels is extensively practised the success of the process is frequently judged by the proportion of material obtained in "points" as compared with the yield of materials of finer grist. In recent years there has been an increasing tendency to practise many materials in the form of individual crystals, and a number of products are on the market in "pea" crystal and cube crystal qualities.

A few moments' thought will enable anybody to realise that these regularly grown crystals of even size can only be produced by special methods in which the crystals are steadily grown. It is obvious that such materials cannot be produced on a large scale in crystallisation of stationary vessels, as this process gives rise to agglomerated masses of crystals. For the production of individual crystals not only is a mechanical process of crystallisation necessary, but the plant employed must be such that all the variable factors entering into the

crystallisation process must be easily and as far as possible automatically controlled.

Whilst much progress has been made in recent years in the design of plant for controlled crystallisation there are still problems to be solved and also phenomena for which no adequate explanations can at present be found. The crystallisation of sodium chloride, delightfully simple in theory, is rather interesting from the practical and commercial point of view. The bulk density of the finished salt is in itself a commercial problem, and although from the point of view of the cost of production vacuum evaporation must take first place, a considerable quantity of salt is still made in ordinary open pans, usually direct fired.

The process of crystallisation of salt in the production of "fishery salt" is still more interesting, and in this case we have an example of a material produced by a comparatively crude process, which has established itself on the market for a special purpose, and which cannot be produced in any ordinary type of evaporating plant. The formation of the hollow pyramid crystals constituting fishery salt can only take place under certain definite conditions, and these are very difficult to imitate in any of the modern evaporating or crystallising plants.

Uncontrolled Crystallisation

Most of the processes under the headings (a) and (b) above will be uncontrolled crystallisation processes, although it should be remembered that for maximum purification in a given number of operations controlled crystallisation and the production of individual crystals is best.

(a) *Uncontrolled Crystallisation by Cooling.*—In plants for uncontrolled crystallisation by cooling, the chief consideration is simply the rapid removal of heat and the commonest mechanical crystalliser is simply a vessel fitted with cooling coils or jacket and a suitable form of agitator. A very large number of different constructions for apparatus for uncontrolled crystallisation have been proposed, but these do not involve any new principles.

(b) *Uncontrolled Crystallisation by Evaporation.*—The best known apparatus falling under this heading is the "salting evaporator," which is well known.

(c) *Uncontrolled Crystallisation by Evaporative Cooling.*—Most aqueous solutions and nearly all solutions in volatile organic solvents can be dealt with by vacuum cooling with the greatest advantage. In these vacuum plants the heat in the solution is removed by the evaporation of part of the solvents at a low pressure, and the solvent condensed in a suitable condenser.

Such processes of crystallisation are particularly indicated where organic solvents have to be employed, and especially when such operations have to be conducted on a really large scale. During the war this method was most successfully applied to the purification of trinitrotoluol in this country.

Controlled Crystallisation

In order to produce controlled crystallisation, such as is necessary for the manufacture of individual crystals of even size and regular shape, it is necessary to employ some form of apparatus in which the solution can be brought into contact with a sufficient area of crystal surfaces. It is also necessary that the temperature and concentration of all parts of the solution can be controlled, and that the crystals shall be prevented from growing together with agglomerated masses.

The ideal plant of this type would be a suspension of crystals, not quite touching each other, which could be kept immersed in a solution of the correct strength. This, however, is not possible and we are compelled to use some form of agitation for keeping the crystals in motion, i.e., to prevent them from agglomerating. If this movement be too violent the crystals will suffer attrition and large crystals will be difficult, if not impossible, to obtain.

The first really promising apparatus was that devised by Wulfi and Bock known as a crystallising cradle or rocking crystalliser. This apparatus consists of a long trough of peculiar shape which can be rocked on supporting rollers. The solution to be crystallised is fed in at one end continuously and the crystals and mother liquor are continuously discharged at the other. Although this machine was very successful with many materials it was found that some materials, which should have been perfectly easy to crystallise, could not be satisfactorily dealt with, the adjustment of the conditions being too

critical. The reason for these difficulties is not easy to realise until one of the machines has been seen in operation. When the rocking crystalliser is operating under the best conditions, a large quantity of crystals is carried in the trough, and when the trough is tilted the solution runs down into the lowest part. At a certain point the mass of crystals slips in small avalanches, and the solution therefore runs along the trough and a longitudinal oscillation of the solution in the trough takes place.

This trouble is not acute with every material, the exact behaviour depending on solubility relations, but it will be realised that since the temperature difference between the solubility and supersolubility curves for most substances is only a few degrees centigrade, a longitudinal oscillation of the liquid in the trough can ruin all prospects of well controlled crystallisation, or make the adjustments far too difficult. These plants have therefore been modified by the introduction of baffles to prevent the longitudinal oscillation of the liquor.

It will be seen that the construction of these machines is of a stiff and substantial kind, and this has been found to be absolutely necessary as the forces which come into play at the reversal point are quite considerable, and a flimsily built vessel of this type does not last long. The machines are now built in various sizes up to 100 ft. long. A convenient size for most purposes is about 50 ft. long, and such a machine takes only about 1½ h.p. for driving. The drive may be either geared or hydraulic.

Whilst the output of this machine depends upon the number of factors, as a rough indication the output in the case of materials of average solubility is about 2 to 3 tons per day when producing crystals up to ½ in. size.

Quite apart from the quality of the crystals obtained, it will be noted that the products are continuously discharged without hand labour, and it may be taken as definitely established that the cost of crystallisation in these machines is less than the cost of crystallisation in stationary vats.

Where really large crystals are demanded the vacuum process is superior in the absence of all prospect of inoculation of the solution from without.

Vacuum machines have to be very carefully constructed and are modified in details according to the operation involved. Broadly, however, the constructions fall into two classes, namely, those in which the crystallisation is accomplished by evaporation and those in which the crystallisation is accomplished by evaporation and cooling.

Whilst it may be argued that the output of all controlled crystallisation plants is comparatively slow, this is not in accordance with the facts. In the case of most materials the controlled crystallising plants carry only about one-sixth the amount of material in process which would be required in the case of stationary crystallisers for production of crystals of about the same size. The labour saving advantages have already been pointed out, and another important point is that the output of crystals is usually extremely even in size and no sifting is necessary.

Discussion on Crystallisation

An informal dinner was held between the reading of the papers and the discussion on crystallisation problems. Mr. C. S. Garland, in the chair, then opened by some references to profit-making manufacturers who were very anxious to sell the right kind of crystals, and told the story of a firm who employed a man at full time for four years finding out how to copy the crystals of a German competitor. When this was done the Germans immediately marketed a powder form which they said was much purer! Col. J. H. Collet then announced that in his opinion the loss in controlling crystallisation overcame any saving in labour. His experience with Glauber salts was clearly not a happy one, but Mr. Griffiths pointed out that the case of Glauber salts was not an easy one for automatic handling because the temperature drop must be entirely kept below the transition point. If the plant was properly fed it worked automatically, and it could handle very large quantities.

Mr. J. A. Reavell then got up and tried by gentle persuasion to get Mr. Griffiths to give away some trade secrets, with the suggestion that as chemical engineers what they wanted to know most was details of operation. He was particularly inquisitive about vacuum crystallisers, but Mr. Griffiths eloquently explained that much as he might like to, he was not allowed to give away any more information about the plant.

Dr. W. R. Ormandy sought information on a point in Mr. Barker's paper on the conditions which determined the formation of mixed crystals, Mr. Barker explaining that it seemed to be necessary to have similar lattices and molecular volumes within about 30 per cent. of one another for two substances to crystallise together. There were, however, exceptions, like the crystallising of naphthol with naphthalene, which wanted explaining. Dr. Ormandy also expressed his disappointment that Mr. Griffiths's paper contained the statement that "nothing was so deleterious to the crystallisation of sugar than the presence of a trace of acid." He was at the moment interested in the problem of crystallising glucose from a distinctly acid solution. Perhaps that knowledge would wake up plant manufacturers to do something, because it was a big problem with money in it!

Dodges for Getting Big Crystals

The variable results obtained in crystallising such an ordinary material as common salt were then described by Dr. W. E. Gibbs. He mentioned a case where they had installed a purifier for the brine, obtaining a clear liquid which did not crystallise nearly so readily as before. The effect of impurities, he believed, was that they acted as nuclei and in some way influenced the formation of the resulting crystals. At any rate it was the practice at his works to ensure the production of a certain class of crystal by adding specific substances in small quantities to the brine.

Mr. R. H. Clayton referred to the very simple methods of crystallising alum in common use, but these produced an agglomeration of crystals of different sizes.

Mr. Sandys Wimisch mentioned an interesting point relating to the crystallisation of calcium nitrate from brine, in which it had been found quite empirically during the war that if the crystals used for seeding the liquor were very pure a much higher yield was obtained. He then suggested a theory of crystal growth which Mr. Barker said would really presuppose exceptional intelligence on the part of the molecules.

Many other useful points were raised and answered. For example, Dr. Gibbs, in reply to Professor E. C. Williams, said that the surface tension of the solution (air-liquid surface) had been found to have no effect on the crystal form. Mr. P. Parrish mentioned the influence of the acidity of the liquor on the nature of crystals of ferrous sulphate, and stated that his experience with muriate of ammonia suggested that customers often did not know what kind of crystal they wanted. Mr. P. H. Joselin raised a laugh by suggesting some rather unusual commercial methods that might be adopted to sell improved forms of crystals.

The discussion was peculiarly informative in view of the restrictions mentioned by Mr. Griffiths about secret processes. Mr. R. C. Menzies expressed his satisfaction with it in this respect, having gained several ideas as to how to get large crystals. Mr. Barker, however, in returning thanks for the congratulatory remarks by Mr. Reavell and Mr. Garland, made a humorous point in suggesting that he hoped to get full details of the methods of preparing the large crystals he wanted for his research by talking quietly to members in corners. Even better than a gift of the secret methods he would like some of the large crystals!

Chemistry at Birmingham University

At Birmingham University a Lord Kitchener Memorial Scholarship has been awarded to Mr. A. E. Rawson, B.Sc., for research in chemistry and chemical bacteriology, and a Priestley Scholarship for chemical research has been granted to Mr. A. E. Chrisman, B.Sc.

During this session two special courses of advanced lectures will be delivered on "Atomic and Molecular Structures" and on "Chemistry in its Relation to Agriculture." The former of these courses, commencing on Wednesday, November 5, at 3.45 p.m., will be given in the Chemical Department, Edgbaston. Admission is free, by ticket obtainable from the Professor of Chemistry at the University, Edgbaston. The latter course will be given in the spring term. A symposium of recent researches from the Chemical Department will be presented at the opening meeting of the Birmingham and Midland Section of the Society of Chemical Industry. This meeting will be held in the English Lecture Theatre, The University, Edmund Street, on Tuesday, November 11, at 7.15 p.m.

French Chemical Industry Notes

[FROM OUR OWN CORRESPONDENT.]

At the French Academy of Science on October 13, the consequences of the presence of colloids in mineral waters were discussed. The instability of bicarbonate waters has already been attributed to colloidal substances, but the phenomenon is as plausibly explicable by chemical reactions or by the presence of molecular complexes. A new fact of some importance is that it is unquestionably a colloid which causes the instability of the bicarbonate chalybeate water of Spa. This conclusion is drawn from the researches of two scientists who, employing a new method, have demonstrated the presence of an iron colloid in Spa waters.

The Industrial Synthesis of Petroleum

The recent Synthetic Fuel Congress and the Buc Motoculture Week have demonstrated that the industrial synthesis of petroleum is at last an accomplished fact. The solutions still to be sought no longer concern either practicability or supply; but are purely problems of price.

At the Buc show an absolutely artificial liquid having the smell and appearance of natural petroleum was poured into a carburettor. The motor was started immediately and worked with the normal efficiency obtainable with mineral motor fuel. In view of this it is interesting to note that the new combustible could be manufactured with any organic matter or residue containing carbon.

The originality of the process lies in the nature of the catalysts utilised and the arrangement of the apparatus. This system, which has already given most interesting results on a semi-industrial basis, is the invention of Messrs. Andry-Bourgeois and George Olivier. The synthetic petrol which it produces, when hydrogenated, furnishes a spirit of light density (0.76) and agreeable smell. Its output in calories, per kilogramme, is estimated at 11,539. Ordinary water and bad valueless coal are the basis of this interesting fuel. The inventors are confident that with large scale production the price of a litre of motor *essence* would be reduced to about 60 centimes. This claim will be tested in a state-aided experimental factory.

Petrol from Vegetable Oils

The artificial petrol referred to must be carefully distinguished from another product obtained by Professor Mailhe, of Toulouse, from animal and vegetable oils. An account of this production by M. Mailhe was given at the Fuel Congress. According to Professor Mailhe the industrial manufacture of petroleum presents no difficulty whatsoever; to render it economically interesting the production of very cheap vegetable oils is, however, indispensable. The first experimental results were procured with linseed oil and electrolytic copper, with alumine as catalyst. The most recent experiments have been within the domain of the catalytic decomposition of fatty acids. With chloride of magnesium as catalyst he has extracted 68 per cent. of synthetic petroleum from a mixture of linoleic, linolenic and arachic acids. Fractional distillation isolated from this petroleum light ether products light, absolutely colourless *essence* (distilling from 75° C. to 150° C.) and burning heavy and glutinous oils. All these are exclusively formed of formenic and ethylenic hydrocarbons and are eminently suitable as motor fuels.

The Economic Standpoint

The economical manufacture is yet to be realised. By saponification a ton of oil yielded 98 kilograms of glycerine (worth 470 frs.) and 902 kilograms of fatty acids giving 630 kilos of petroleum having a present value of 1,256 frs.—total 1,726 frs. The manufacturing expenses of synthetic petroleum are declared to be small, but the cost of a ton of oil, said M. Mailhe, should not in any case exceed 1,500 frs. Unfortunately, the inferior oils fetch more than 300 frs. per 100 kilos (one-tenth of a ton) and therefore very cheap vegetable oils must be obtained "by methodical and serious efforts." Without this a practicable petroleum of the Mailhe type is not possible. West African districts can yield enormous quantities of palm, castor and other vegetable oils. Marine life and even the refuse of eatable fish constitute a source of fish oils. Professor Mailhe is convinced that the commercialised product is possible.

British Association of Chemists

Annual General Meeting and Dinner

THE seventh annual general meeting of the British Association of Chemists was held at the Imperial College of Science, South Kensington, on Saturday, October 25, at 3 p.m. Dr. Herbert Levinstein, retiring President of the Association, was in the chair. Mr. I. Boodson, General Secretary, presented the Hon. Treasurer's report, Mr. H. E. J. Cory being unavoidably absent.

In his address the President made allusion to those members who, by non-payment of their subscription, had seriously hindered the work of the Association, and appealed to all to make it a point of honour to recognise their duty in this respect. The report made very clear the unique advantages that the Association had to confer. It had set up a standard of qualification; it supported substantially those of its members who were unemployed, and it had given, in the current year, legal aid to several of its members. Dr. Levinstein considered that those firms who were members of the Association of Chemical Manufacturers would in many cases be prepared to give the Association substantial support; since the Association, pledged as it is to maintain a high standard for the profession, was able and willing to assist manufacturers in every possible way.

B.A.C. and the Dyestuffs Agreement

It was greatly to the credit of the B.A.C. that it had been the first chemical organisation to wait successfully upon the President of the Board of Trade in connection with the Dyestuffs Agreement controversy, and it was due, in large measure, to the Association's influence that a serious blow at the dyestuffs industry of this country had been turned aside.

The general discussion was opened by Mr. Rowell, who rose on a point of order. Since 21 days' notice had not been given of the meeting, he thought the matter ought to be adjusted by means of a resolution. It was finally decided that should any question arise in this connection, that the General Secretary be instructed to take such steps as may be necessary to set the matter right. Mr. Rowell, continuing, said that decided progress had been made, but that a considerable increase in membership was necessary if there were to be any rapid advance. He indicated that Birmingham was preparing a scheme which he claimed had already proved successful on a small scale and which might, in his opinion, be the more satisfactory as its scope increased. In conclusion, Mr. Rowell expressed the hope that the Association would collect information in regard to salaries, so that particulars touching minimum salaries paid might be obtained, and employers who paid less than the average amount might be approached with a view to adjustment of the matter.

Officers for the Coming Year

Officers for the ensuing year were then elected as follows:—President: Dr. E. F. Armstrong, D.Sc., F.R.S. Vice-Presidents: Mr. W. E. Kay and Mr. F. Scholefield, M.Sc. Registrar: Dr. David Bain, D.Sc. General Secretary: Mr. I. Boodson, B.Sc. Treasurer: Mr. H. E. J. Cory, M.Sc. Editor: Mr. Henry T. F. Rhodes. The Assistant Secretary, Mr. A. Stewart Mills, F.R.S.E., the Auditors, Messrs. Hughes and Allen, and the Legal Advisers, Messrs. Bingham and Sharp, were also appointed.

Council Meetings at Derby

Mr. Knapp (Birmingham) then rose to put the Birmingham resolutions, which he explained were advanced as temporary measures with a view to economy. The first and second of these, that Council Meetings be held on alternate months and that they be held at Derby, were accepted, but some discussion arose as to the third, that Sections be allowed to send at the Association's expense only one Councillor to each Council Meeting. After some energetic comments in which Mr. W. E. Kay and the London Delegates took part, Mr. E. R. Redgrove's (Senior London Delegate) amendment, that the words "at the Association's expense" be deleted, was carried.

Mr. W. E. Kay, Vice-President of the Association, then proposed a vote of thanks to the retiring President. He pointed out how much moral and material aid Dr. Levinstein had lent to the Association and how its success had been due, in large measure, to his energy and enthusiasm.

The kindness of Professor Baker of the Imperial College had made possible a tour of inspection of the laboratories,

and this took place at the close of the meeting. The thanks of the Association are due to Professor Baker for his kindness, and to his representative, who conducted the tour.

Successful Annual Dinner

In the evening a dinner was held at the Engineers' Club. Although many of the chief guests representing other chemical bodies were unable to come owing to the imminence of the election or other unforeseen causes, the event was a very successful one. Dr. H. Levinstein was in the chair, in lieu of the President, Dr. E. F. Armstrong, and the principal guest was Mr. R. B. Pilcher, the Registrar of the Institute of Chemistry. Dr. Levinstein, in proposing the toast of the B.A.C., said that though in some ways it was the "unwanted child" of the industry, in seven years it had got 1,000 members, and was able to look after such matters as salaries, contracts, and dismissals through unemployment, which no other body could handle. Though he was aware of the cost of belonging to various societies he urged chemists to join all the societies which dealt with their particular needs. Mr. E. F. Morris, in replying to this toast, pointed out that the encouragement of employment of chemists was in itself a remedy for unemployment, as they would agree when they considered how much work the investigations of one chemist could produce in ten or fifteen years.

Mr. R. B. Pilcher, in replying to the toast of the kindred societies, proposed by Mr. R. Redgrove, disclaimed any share by the Institute of Chemistry in the parentage of the B.A.C. Mr. Pilcher, after mentioning one or two other matters, referred to the Chemistry House schemes which had been recently discussed. He pointed out that the Institute held premises on Crown land, and the Chemical Society had rent-free rooms from the Government. If these were evacuated and proper compensation made, this, together with the accumulated funds of other societies, should bring in practically all the money needed.

The meeting was enlivened with a considerable proportion of song, story and other entertainment by members of the Association, and as an indication of the pleasant atmosphere which existed it may perhaps be mentioned that Mr. Pilcher himself contributed a song.

American Glass-making Practice

THE first meeting of the Society of Glass Technology for the session 1924-25 was held in Sheffield on Wednesday, October 15, the President, Colonel S. C. Halse, in the chair. An address entitled "The Present Position of the Glass Industry in North America" was given by Professor W. E. S. Turner, D.Sc., who referred to the gradual disappearance of pot furnaces in favour of tank furnaces. Electric light bulbs, except in the case of very small or very large bulbs, were now practically all made by machines fed from tank furnaces, the glass being the soda-lime-magnesia type. During the past few years there had been a very distinct development in the use of blowing machine or press and blow machines. Dealing next with sheet glass, Professor Turner remarked that the Fourcault process had not as yet achieved any considerable success in America. The cylinder process was still in active operation. An epoch-making process was that developed at the glass works of the Ford Motor Co. The glass was melted in tanks, and there was continuous rolling between a pair of rollers, the sheet passing down a Lehr about 440 ft. long, and subsequently, in sheets, traversed long tables in a continuous belt, where the grinding and polishing were done.

Professor Turner also dealt with the problems of furnaces and furnace efficiency, which was one of the foremost problems discussed by glass manufacturers. The average life of a tank furnace operated by machines was eleven to thirteen months. A table was presented showing for a number of factories the value of the ratio of fuel consumed to glass melted. Several factories could show a ratio as low as 0.6.

Dyeing Trade Wages Claim

THE negotiations in Manchester on the wages dispute in the bleaching, dyeing, printing, and finishing industry ended on Tuesday, October 28, with the two sides still in disagreement, and it was decided to leave it to Sir William MacKenzie, K.C., who sat with them as independent chairman, to give an award. This he will do later. His award will be on the claim of 80,000 workers in the industry for an advance of 10 per cent on base wage rates, and certain revision of the cost of living agreements.

The Institute of Chemistry

Mr. Marlow on Service Agreements

THE annual general meeting of the Manchester and District Section of the Institute of Chemistry was held on Wednesday, October 22, at the Textile Institute, Manchester. Mr. S. E. Melling, F.I.C., presided.

Mr. R. S. Wishart was unanimously appointed hon. secretary of the Section. Messrs. H. Fairbrother, F.I.C., E. W. Marchant, A.I.C., P. Chorley, A.I.C., and F. W. Linch, F.I.C., were elected to fill vacancies upon the committee.

The hon. secretary stated that the programme for the ensuing Session embraced several social evenings, as it was considered desirable that every opportunity should be afforded the members to become intimately acquainted with each other. Messrs. Marshall and Schofield were nominated as the Section's candidates for election on the Council.

The Chairman reported that the suggested amalgamation of the British Dyestuffs Corporation with the I.G. had been resisted by the Institute in collaboration with other scientific bodies. The Conference at Liverpool, last year, was very successful. An amicable arrangement had been arrived at with the Textile Institute respecting the establishment of an examining authority which would not interfere with the normal functions of the Institute of Chemistry as a qualifying registering body. The question of the adoption of academic robes for Fellows and Associates had been left in abeyance for the time being.

"Service Agreements—Duties and Privileges."

In a paper on this subject Mr. G. S. Marlow, assistant secretary of the Institute of Chemistry, stated that any contract which could be performed within a year from the date of its making must be in writing. A series of letters in which the writer finally agreed to accept a position would constitute a contract. It was, however, obviously more prudent to have a formal document prepared. Mr. Marlow then dealt with the customary legal points, such as consideration, the inability of a minor to make a contract, authorised signatories to contracts, the fact that a single partner can bind the partnership firm, and the requirement of diligent service upon the part of the employee. The various methods by which contracts could be terminated, such as by giving notice, improper dismissal, bankruptcy of the firm, etc., were also dealt with, and the legal course of action for both employers and employed explained. The question of barring-out clauses was also fully dealt with. In cases of claims for wrongful dismissal it was necessary to demonstrate to the Court that the employee had endeavoured to minimise the damages by diligently seeking to obtain another situation.

Upon the motion of Dr. Ardern, seconded by Mr. Elsdon, a hearty vote of thanks was accorded Mr. Marlow for his paper.

Alleged False Customs Declaration

ALLEGATIONS that he had made false declarations to the Customs as to the value of scientific glassware were preferred against Charles Gray, of Leigh-on-Sea, at the London Mansion House Police Court on Tuesday, October 28. There were several summonses, and also alternative charges of attempting to evade Customs duty.

Mr. Gibson, for the Customs, dealt with the summonses relating to goods landed at Millwall on April 24, 1923. He said that fifteen cases of scientific glassware were concerned. They were sent by a German manufacturer named Lorenz, and were liable to 33½ per cent. duty, and also to the German reparation levy of 26 per cent. Gray had one case consigned to himself. The others were to the order of the Scientific Glass Blowing Co. and F. E. Becker and Co., but without the knowledge of either of those firms. Gray, who was a personal acquaintance of Lorenz, arranged that the whole of the goods should be consigned to himself, and he had their value entered with the Customs at £45 11s. 11d. The prices charged on the invoices to the other two firms were £110 17s. 11d. for eleven cases, and £27 15s. 6d. for three cases, plus duty. The Customs contended that the total value of the fifteen cases was over £200.

Letters had been found which had passed between Lorenz and Gray. In one, Lorenz asked Gray how much the fine

would be, "so that he could arrange payment." In a reply Gray said it was not his fault "that this had happened"—apparently the detention of the goods by the Customs—and that he was liable to a big fine and might even be sent to prison. These letters, said Mr. Gibson, proved there was between the two men a definite plot to attempt to defraud the Customs of the duties.

Called for the prosecution, Charles Ewart Midgley, Customs officer at Millwall Dock, said he detained the goods because he disagreed with the stated value.

Mr. O. L. Gower, director of Baird and Tatlock, called as an expert valuer, said that the fifteen cases contained goods of between £200 and £250 value.

Mr. A. E. Robinson submitted a list of Lorenz's prices to Mr. Gower, who admitted they were "ridiculously low."

The magistrate intimated that he would commit defendant for trial on the charge of false declaration, and said that both sides would have time to get expert evidence on prices. Gray, who pleaded not guilty and reserved his defence, was then committed for trial at the sessions and bound over in his own recognisances of £100. The charges against him of attempting to evade payment of duty, which was limited to £100 to bring them within summary jurisdiction, were adjourned.

Alleged Noxious Fumes Nuisance

THE Court of Session on Saturday, October 25, heard an appeal from the Sheriff Court at Glasgow for the defenders in the action by Richard H. Bulloch, of Glasgow, against Alexander Hope, Junior and Co., Ltd., Anchor Chemical Works, Provanmill, for payment of £142 15s. 3d. as damages for loss and injury. The action was founded on alleged nuisance. The company carries on business as manufacturers of sulphuric, hydrochloric and nitric acids, and the complaint of the pursuer, who is owner and occupier of a house and garden situated about 500 yards to the east of the defenders' works, was that, for some years past, and particularly during the first half of 1922, noxious fumes from the defenders' works had destroyed the greater part of the produce of his garden, corroded the ironwork about his cottage, and rotted textile materials there. He did not ask damages on account of personal discomfort or injury or danger to health. The defenders maintained that their manufacturing operations having been conducted in a proper manner in conformity with the provisions of the Alkali, etc., Act, 1906, had not constituted, and did not constitute, a nuisance.

It was not proved that the defenders had during the period libelled, caused or permitted noxious fumes to go upon the property of the pursuer so as to cause material damage. The defenders were assolized with expenses.

At an appeal it was found that the defenders had permitted noxious fumes to go upon the pursuer's property so as to cause material damage to the property, and that the defenders were liable in damages, assessed at £60, and found the defenders liable in expenses. The defenders appealed to the Court of Session. The Division affirmed the judgment of the Sheriff, and dismissed the appeal, with expenses to the pursuer.

The Lord President said the pursuer's case rested on local evidence and upon expert examination and opinion. Local people spoke of the presence of sulphurous fumes in the air, and of an occasional mistiness which overlay the works.

Examination showed the presence of sulphuric acid in more than normal proportions. The defenders did not challenge the amount of the damages, and the Lord President accepted the Sheriff's figure.

Demand for Chemicals in Greece

A FIRM in Athens is anxious to act as the representative of chemical firms in this country who have not so far any commitments in Greece. The substances in which they are more particularly interested are borax (crystal and powdered), naphthalene, bleaching powder, calcium chloride, acetylene, alum (powdered and lump), caustic soda, carbonate and bicarbonate of soda, sal ammoniac (crystal and lump), also wheat and rice starch. English firms interested should communicate with the Editor of THE CHEMICAL AGE, mentioning reference number H.41.

From Week to Week

CHEMISTRY AND PHYSICS classes have been started at Gloucester Technical School.

MR. S. G. P. PLANT, of Magdalen College, has been appointed lecturer in organic chemistry at Oxford University.

A NEW BIO-CHEMICAL research department has been opened at the Children's Hospital, Great Ormond Street, London.

THE PRINCE OF WALES is expected to open the new science buildings of Edinburgh University at Liberton during this term.

ETHER PLANT AND MACHINERY will be sold by auction at H.M. Factory, Pembrey, South Wales, on Wednesday, November 12.

ALDERMAN JOHN GRINDELL, of Hull, one of the oldest members of the City Council, has died. He was in business as a seed crusher.

A NEW NON-INFLAMMABLE PAPER is said to have been produced in Germany. Fire-resisting varnishes are stated to be produced at the same plant.

ACCORDING TO REPORTS the palm oil industry is rapidly developing in British Malaya. There is now 5,000 acres under cultivation and the export of oil and kernels has already started.

A VERDICT of "Suicide whilst of unsound mind" was returned on Mr. A. J. Watson, of Northallerton, a director of the North Eastern Salt Co., whose body was found in Saltburn Pleasure Gardens beneath a bridge.

THE FIRST MEETING of the London Section of the Society of Chemical Industry this session will be held at Burlington House, Piccadilly, on Monday, November 3, at 8 p.m. Mr. W. J. U. Woolcock will give an address on "Experiments in Protection."

THE STREATFIELD MEMORIAL LECTURE will be given in the Chemical Lecture Theatre, Finsbury Technical College, City Road, London, E.C.2, on Thursday, November 6, at 4 p.m. The lecturer will be Mr. Julian L. Baker, F.I.C., and the subject "The Chemist and the Fermentation Industries." Professor H. E. Armstrong will preside.

THREE DEATHS have been reported from the works of the Standard Oil Co. in New Jersey, where tetra-ethyl-lead is being manufactured as an anti-detonating agent for petrol. In addition, seven patients have been admitted to hospital suffering from mental derangements. Experts are said to be of the opinion that inhalation of quite small amounts of petrol treated with tetra-ethyl-lead has a harmful effect on the lungs, nerves and brain.

MR. F. C. A. H. LANTSBERY, recently appointed managing director of William Jessop and Sons, Ltd., steel manufacturers, of Sheffield, was for nine years with the Birmingham Small Arms Co., Ltd., as chief of the works and research laboratory. For three years he was in the metallurgical research department of the National Physical Laboratory. Mr. Lantsberry is a graduate of Manchester University, and he received the degree of Master of Science for a metallurgical thesis.

THE COUNCIL OF LEEDS UNIVERSITY has appointed Dr. F. S. Fowweather to the recently instituted Lectureship in Chemical Pathology. Dr. Fowweather graduated with first-class honours in chemistry (first division) at Liverpool University in 1914, gaining the Isaac Roberts scholarship and the John Willox exhibition. After a year's research he was awarded the M.Sc. degree, and he is also a Fellow of the Institute of Chemistry. He has had chemical experience in industry.

THE HIGH COMMISSIONER FOR CANADA IN LONDON has received from the Mines Branch of the Dominion Department of Mines a copy of Memorandum No. 17 by Mr. C. S. Parsons dealing in detail with the Lake George (N.B.) and Antimony Ores and their concentration. The memorandum may be consulted at the Office of the High Commissioner for Canada, Kinnaird House, Pall Mall East, London, S.W.1, and copies obtained on application to the Department of Mines at Ottawa. The High Commissioner has also received from the Dominion Department of Mines some copies of a booklet by Mr. R. T. Elworthy of the Mines Branch in regard to the natural gas resources of Alberta, and these are obtainable by mining engineers and others on application.

A NEW SOAP works for Hovey, Ltd., has been sanctioned by Sandbach (Cheshire) Urban Council.

DYEING PLANT at Victoria Works, Eccleshill, near Bradford, will be sold by auction on Wednesday, November 5.

MR. E. B. KING, of Balliol College, Oxford, has been elected to the Duke of Westminster Research Studentship in Physics.

DEPOSITS OF VIRGIN SULPHUR, says a Moscow message, have been discovered near the sources of the River Terek in the Caucasus.

MR. ERNEST CLARK has been awarded a scholarship to the Royal College of Mines by the Institution of Petroleum Technologists.

MR. F. E. G. MOON, of Petters, Ltd., Yeovil, is to take up a position at Ocean Island, Central Pacific, under the British Phosphate Commissioners.

MR. F. W. ROBINSON, formerly head of the firm of John Robinson and Sons, dyers, of Conker Lane, Huddersfield, has died at Southsea, aged 84.

OUR ENTERPRISING CONTEMPORARY, *The American Gas Journal*, has been producing a daily issue, equal in size to the ordinary weekly number, during the sixth annual convention of the American Gas Association.

LEVER BROTHERS, LTD., have entered into a contract for the construction of dock and reclamation walls on the Mersey. The dock is to facilitate the handling of traffic in connection with the company's works at Port Sunlight and Bromborough.

A MEETING of the West Yorkshire Metallurgical Society will be held at the George Hotel, Huddersfield, on November 4, at 7.30 p.m., when the President will deliver his inaugural address. Afterwards, a discussion will take place on "The Influence of Casting Temperature on the Physical Properties of Non-Ferrous Alloys."

MR. ROBERT WRIGHT, whose death took place at Hough Green, had been associated with the chemical industry for many years. Before the formation of the United Alkali Works he was employed at the Widnes Alkali Works and afterwards he joined Muspratt's works. Mr. Wright was in charge of the shipping department there when he retired in 1921.

THE LONDON OFFICE of "Combustion" has been removed from Aldwych House to Africa House, Kingsway, W.C.2, and the general representative is Mr. E. Kilburn Scott, A.M.Inst., C.E. The paper will continue to give special attention to all matters connected with combustion of fuels and the generation of power. Arrangements are being completed for the simultaneous publication of the paper in London, New York, Paris, and Berlin.

THE DATE OF THE BRITISH INDUSTRIES FAIR (Midland Section) has been fixed for February 16 to 27, at Castle Bromwich, Birmingham, so that it will run concurrently with the London Section at the White City. The Birmingham exhibits will include paints, colours, enamels, varnishes, stains, polishes, lacquers, metal powders, glues and adhesives; mechanical and hand painting and spraying apparatus, decorating materials, wall papers and coverings.

MR. T. W. STUART, general manager of the United Alkali Co., Ltd., speaking at Liverpool, gave interesting information on maintaining peace between employers and employed. He stressed the value of "lightning hearing of grievances." Two main causes of disputes were lack of understanding and long delays before grievances were tackled. A significant result of making himself accessible to every one of his ten thousand men was that he had not had one strike, excluding a small affair amongst bricklayers, during or since the war.

BIRMINGHAM'S CITY ANALYST, in a report for the third quarter of this year, records that one of sixteen samples taken under the Rag Flock Act contained 80 parts of soluble chlorine per 100,000, the limit being 30 parts. Of 1,113 samples submitted by the Food and Drugs Inspectors, 42 were found to be adulterated and 10 were found incorrectly labelled. Mr. Liverseege expresses the hope that the report of the Departmental Committee on Food Preservatives and Colouring Matters will result in legislation that will put an end to the present uncertain law with regard to the drugging of food with preservatives.

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Abstracts of Complete Specifications

222,159 and 222,423. ADSORBENT MATERIALS, MANUFACTURE OF. J. N. A. Sauer, 43, Johanna Verhulststraat, Amsterdam, Holland. Application date, March 26, 1923.

222,159. Specifications Nos. 183,485 and 184,473 (see THE CHEMICAL AGE, Vol. VII., pp. 462 and 538) describe the precipitation of calcium carbonate, sulphate, and phosphate from hot solutions for the purpose of clarifying liquids, and the present invention consists in making such precipitates having adsorptive qualities. The efficiency of the precipitate depends on a balance between the adsorptive qualities and the capacity of the solid for separation by filtration. Calcium carbonate made in the usual manner contains a slight excess of lime which is not removable by prolonged washing, and this alkalinity has a prejudicial effect. Neutral calcium carbonate is obtained in this invention by treating calcium oxide or hydroxide with an acid in the presence of an alkali metal salt or its hydroxide. Alternatively, the calcium salt is precipitated by a large excess of the alkali metal salt, and the latter is regenerated from the hydroxide produced by a subsequent reaction with the acid after the removal of the calcium salt. If the concentration of the solution is too weak, the precipitate obtained is partly colloidal, while if it is too high the precipitate is mostly in gel form. At a low temperature, the precipitate is colloidal but becomes crystalline at higher temperatures.

In an example, milk of lime of 5° Bé. strength is mixed with a 10 per cent. solution of caustic soda containing about 10 per cent of caustic soda on the weight of calcium oxide present. The mixture is heated to 90° C. in a closed vessel, and carbon dioxide passed through it. Calcium carbonate and sodium carbonate are simultaneously produced, and the latter acts on the lime in solution, forming calcium carbonate and caustic soda. The presence of the caustic soda makes the milk of lime viscous, and produces a precipitate of the quality necessary for filtration and adsorption purposes. The precipitated calcium carbonate is separated by means of a filter or centrifugal separator and washed, while the remaining liquid is used again. If the precipitated carbonate is to be used for oils, it may be washed with soda, benzene, alcohol, etc. For adsorption purposes, the precipitate is preferably used without drying, but if dried, it may be mixed with substances such as soda, amylin, gelatine, casein, or tannin, to prevent the cohesion of the precipitated particles.

In an alternative process, the lime and caustic alkali or alkali carbonate are treated with carbon dioxide and steam at increased pressure, *e.g.*, by atomising them into a chamber through which carbon dioxide and steam are passed. The calcium carbonate is thus obtained in a dry form, and in the desired physical condition. In another alternative, milk of lime may be treated with sodium carbonate solution in 25-50 per cent. excess above the quantity necessary to precipitate the lime. The mother liquor consisting of sodium carbonate and caustic soda is then treated with carbon dioxide to convert it completely into sodium carbonate, which is then used again. A similar process may be used to produce calcium sulphite, sulphate, oxalate, tartrate, or phosphate. These precipitates are particularly suitable for treating sugar solutions.

222,423. This is a development of the process described in Specification No. 222,159 above. The precipitated insoluble alkaline earth metal salt is prepared as above, and another adsorptive alkaline earth metal salt is deposited on the precipitate, so that a relatively cheap carrier may be used as a support for a more expensive adsorptive substance or a softer adsorptive substance. The adsorptive precipitate may be formed in the presence of the coating or impregnating salt or substance, or the precipitate may be washed with a solution of the coating salt or substance. In one example, the precipitate of calcium carbonate is treated with a small quantity of phosphoric acid, which produces a diphosphate on the surface of the calcium carbonate particles, so that the resulting adsorbent possesses decolorising and ash removing properties. If the precipitate is to be dried it may be treated with substances such as tannin, starch, glue, soda, or sugar to prevent adhesion of the particles to one another. A more expensive precipitate such as calcium phosphate, citrate, tartrate, oxalate, sulphite, etc., may thus be deposited on the surface

of a cheaper precipitate such as calcium carbonate. The balance between adsorptive and filtering capacities may thus be adjusted since calcium phosphate may form a slimy precipitate alone.

222,181. FERTILISERS. I. Ishitani, 2, Suwa, Totsukamachi, Toyotama-gun Tokio-fu, Japan, and Asahi Garasu Kabushiki Kaisha, 1, Eiraku-cho 1-chome, Kojimachi-ku, Tokio, Japan. Application date, June 21, 1923.

This is a modification of the process described in Specification No. 218,401 (see THE CHEMICAL AGE, Vol. XI., p. 172) for producing a forcing agent for manure. The colloidal magnesium silicate is dried to facilitate transport, but if dried by the usual method its activity decreases due to the loss of its colloidal properties. This may be avoided by previously mixing with an aqueous solution of *Chondrus ocellatus*, and the colloidal silicate then resumes its activity on adding water. The dry powdered magnesium silicate thus obtained may be used as a manure, with or without a nitrogenous fertiliser, and its effect is equal to that of wet colloidal silicate. Other protective colloids such as gum arabic, *gloiopeltis* glue, *Kadzura japonica*, gelatine, etc., may also be used.

222,168. SOLUTIONS, DOPES OR VARNISHES MADE WITH CELLULOSE ACETATE, MANUFACTURE OF. C. Dreyfus, 8, Waterloo Place, London, S.W.1. Application date, May 18, 1923.

It has been found that solutions of cellulose acetate and other organic derivatives of cellulose are miscible in all proportions with acaroid resins. When a solution of cellulose acetate and acaroid resin in acetone is evaporated, a uniform product is obtained. The acaroid resin imparts to the solution when evaporated the property of impermeability to water and gases, and also electric insulating properties. The resin and cellulose derivative may be dissolved in high or low boiling solvents, such as acetone, alcohol, benzol-alcohol, acetone, methyl acetate, ethyl acetate, ethyl-methyl ketone, or mixtures of such solvents or in other solvents such as tetra-chlorethane, with or without alcohol, acetone, etc. Owing to the physical affinity of these resins for cellulose acetate the usual plasticisers employed in making varnishes may be dispensed with, but any known plasticising agents may be added if required, such as triacetin, camphor, camphor substitutes, paratoluene sulphonamide or its derivatives, diethyl-phthalate, paratoluene sulphanilide, high-boiling liquid alkylated benzene, toluene, or xylene sulphonamide derivatives, triphenyl phosphate, or tricresyl phosphate. Acaroid resin may be used in any proportion up to double the weight of the cellulose derivative, and other substances such as high-boiling solvents, stabilisers such as urea or its derivatives, combustibility reducers such as triphenyl phosphate, filling materials, dyes, etc., may also be added.

222,268. ARSENICAL PREPARATION FOR PROTECTING PLANTS, MANUFACTURE OF. H. Vogel, Premnitz, Prussia. Application date, August 4, 1923.

It is usually assumed that arsenic trisulphide is not poisonous owing to its insolubility, but a poisonous preparation may be made by preparing the arsenic trisulphide as a colloidal suspension. A saturated aqueous solution of arsenious oxide is prepared by adding arsenious oxide slowly to warm or hot water. The unstable vitreous modification of arsenious oxide has a considerably higher solubility than the crystalline modification usually employed, and is therefore used in preference. This solution is mixed with a protective colloid, and the arsenic trisulphide is precipitated with sulphuretted hydrogen at a temperature of about 6° C. while agitating the solution. A suitable protective colloid is obtained by boiling pine wood and pine needles with water until the concentrated solution contains 50 per cent. of organic substance. About 5 per cent. of this solution is added to the arsenious oxide solution. The resulting colloidal suspension is employed at a strength of about 0.03 to 0.05 per cent. of As_2S_3 .

222,270. COKE, TREATMENT OF—IN THE MANUFACTURE OF GAS. O. Y. Imray, London. From N. V. Silica en Ovenbouw Mij, 17, Raamweg, The Hague, Holland. Application date, August 7, 1923.

It has been found that the addition of a small proportion of a finely divided heavy metal or its oxide to coal before it is coked or to the coke, has a remarkable effect in increasing the

combustibility of the coke. It is preferred to use iron, iron oxide or iron carbonate so that the metallic content of the coke amounts to 1-3 per cent. Alternatively, coke made in the usual manner may be impregnated with a solution of an iron salt which will yield an oxide when heated. The coking operation is preferably conducted at above 900° C. It is found that the coke thus obtained has an increased efficiency in ordinary gas producers or water gas producers, due to its increased power in reducing carbon dioxide to monoxide. It is found that the combustibility of the coke obtained is greatly increased and the calorific value of the producer gas obtained is increased from 1,200 to 1,400 calories per cubic metre.

222,279. DRYING AND COATING POROUS MATERIALS FOR USE AS ADSORBENTS AND CATALYSTS, PROCESS FOR. G. D. Fitzpatrick, 38, Church Road, Moseley, Birmingham. Application date, August 17, 1923.

The process is for removing water from finely divided porous materials for use as adsorbents and catalysts such as colloidal gels, gelatinous precipitates, etc. This removal of water is necessary to prevent the coalescence of the particles. Such dried gel substances will absorb moisture when exposed to the air, which would decrease their efficiency as adsorbents or catalysts. The material is brought into contact with a liquid or vapour which will displace the water in the material, and the excess of liquid may then be removed by distillation or other means to leave a residual film on the surface of the dehydrated material. Alternatively, the amount of liquid used is insufficient to fill the pores of the material, which is then subjected to a temperature which leaves a surface film on the material. An example is given of the treatment of a silicic acid gel. This is first concentrated by evaporation to a gel containing 60-90 per cent. of silica. The gel is then treated with an oil which distils at about 200° C. and the mixture is heated to about 100° C. until all water is expelled. The excess of oil is removed by distillation leaving a film of oil in the pores of the gel.

Alternatively, the residual film is decomposed by heat so that it is replaced with a film of carbon. This film constitutes 1-2 per cent. of the weight of the gel, and has no appreciable effect on the adsorptive properties but prevents contact between the silica and the adsorbed substances. The oil may be mixed with an emulsifying agent such as purified wool grease or a heavy metal soap, in the proportion of 1-2 per cent. This facilitates the replacement of the water in the gel. Oleates or other soaps containing nickel, copper, or silver may be added to the oil, so that a catalyst is deposited with the coating film. Instead of immersing the gel in the liquid it may be treated with oil vapour, which condenses in the pores of the gel. In another modification, the gel may be treated with only a small quantity of oil, and then with dry air or gas heated to 120-150° C., to remove all moisture. It is found that gels treated in this manner do not shrink as ordinary gels do on drying, so that a more bulky product is obtained.

NOTE.—Abstracts of the following specifications which are now accepted, appeared in THE CHEMICAL AGE when they became open to inspection under the International Convention:—200,815 (L. Lilienfeld) relating to manufacture of cellulose ethers, see Vol. IX, p. 319; 203,713 (J. Duclaux) relating to membranes for ultra filtration and dialysis, see Vol. IX, p. 581; 204,337 (Hartstoff-Metall Akt.-Ges. (Hame-tag)) relating to a process of producing substances from boron and carbon, see Vol. IX, p. 582; 207,196 (Farbenfabriken vorm. F. Bayer & Co.) relating to a process for obtaining sulphur from a gas containing hydrogen sulphide, see Vol. X, p. 122; 208,721 (Compagnie Nationale de Matieres Colorantes et de Produits Chimiques) relating to a process for the manufacture of perylene, see Vol. X, p. 202.

International Specifications not yet Accepted

220,930. DYES. Farbwerte vorm. Meister, Lucius, and Brüning, Hoechst-on-Main, Germany. International Convention date, August 21, 1923. Addition to 215,782.

Specification 215,782 (see THE CHEMICAL AGE, Vol. XI, p. 71) describes a process for producing dibenzanthrone compounds, and in the present invention a nitro-dibenzanthrone is treated with an alkaline condensing agent in place of a nitro-dibenzanthronyl. Examples are given in which

mononitro-dibenzanthrone and dinitro-dibenzanthrone are fused with caustic potash. To obtain the dinitro compound, dibenzanthrone is nitrated with nitric acid in nitro-benzene. These dyes give greyish-blue to black tints on cotton from a violet hydrosulphite vat.

220,936. HAFNIUM AND ZIRCONIUM, SEPARATING. Naamlooze Vennootschap Philips' Gloeilampenfabrieken, 6, Emmasingel, Eindhoven, Holland. (Assignees of D. Coster, 24, Maximstraat, Haarlem, Holland, and G. von. Hevesy, 15, Lille Strandvej, Hellerup, Copenhagen.) International Convention date, August 25, 1923.

Zirconium hydroxide containing hafnium is dissolved in an excess of oxalic acid and crystallised; or oxalic acid in excess is added to a solution of a zirconium salt; or ammonium oxalate is added to a solution of the oxyhalogenides or nitrates. In all these cases, the simple or complex oxalates of hafnium and zirconium crystallise fractionally. The zirconium hydroxide may be obtained by precipitation with ammonium hydroxide from the sulphate.

220,953. THYMOL AND MENTHOL. G. Austerweil, 113, Boulevard Jean-Jaures, Boulogne, France. International Convention date, August 21, 1923.

To obtain thymol, *p*-cymene is nitrated in concentrated sulphuric acid solution, and a solution of the 2-nitro-cymene in concentrated sulphuric acid is electrolysed in a cathode chamber at 60° C., while covered with molten paraffin wax. A high current density on the cathode is employed. The product is *p*-amino-thymol, which is neutralised, diazotized, and reduced in acid solution with stannous chloride, or in alkaline solution with sodium stannite. The resulting thymol is separated by steam distillation.

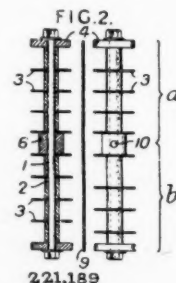
To obtain menthol, the thymol is treated in an autoclave with hydrogen at 15 atmospheres pressure, and at a temperature of 160-170° C. in presence of a nickel catalyst. To prepare the latter, nickel carbonate is precipitated on kieselguhr and reduced with hydrogen. To purify the menthol, it is treated in acetic acid solution with chromic acid, and the menthone reduced in alcoholic solution with sodium; alternatively, it is converted into the phthalate and the menthol obtained by saponification.

220,964. DYEING. Durand et Huguenin Soc. Anon., Basle, Switzerland. International Convention date, August 25, 1923. Addition to 203,681. (See THE CHEMICAL AGE, Vol. IX, p. 522.)

Dyeing is effected by impregnating the material with a mixture of a salt of an ester of a leuco vat dye such as described in Specification 186,057 (see THE CHEMICAL AGE, Vol. VII, p. 716) and an oxidising agent, and then developing the dyeing by steaming. A catalyst may be added to promote the oxidation. As an example, cotton is dyed with a solution containing the ester salt of dihydro-indigo, ammonium vanadate or potassium ferricyanide, and sodium chlorate, and steamed.

221,189. ELECTROLYSIS. Nordiske Fabriker De-No-Fa Aktieselskap, 14, Kirkagaten, Christiania. International Convention date, August 29, 1923.

An electrode for electrolysis consists of a bolt 1 on which are threaded thin sheets of iron 3, spaced by tubes 2. Current



is supplied through a conducting block 6 which has an arm 10 for support and for conducting current. The positive and negative electrodes are arranged with their plates 3 opposite to one another as at *a* or staggered as at *b*.

LATEST NOTIFICATIONS.

- 223,543. Industrial process and apparatus for the synthetic manufacture of hydrocarbons by the electrical method. Soc. Anon le Petrole Synthétique. October 19, 1923.
 223,572. Process for the commercial production of pure oxide of zirconium. Soc. d'Etude des Agglomeres. October 17, 1923.
 223,573. Refractory products and their manufacture. Soc. d'Etude des Agglomeres. October 17, 1923.
 223,596. Manufacture of new dyestuffs of the pyrone series. Farbenfabriken vorm. F. Bayer and Co. October 18, 1923.

Specifications Accepted with Date of Application

- 201,940. Silicates of the basic dyestuffs, Manufacture of. W. Eberlein. December 21, 1922.
 202,654. Purifying and sterilising liquids and gases, Process of and apparatus therefor. J. N. A. Sauer. August 18, 1922.
 206,512. Formaldehyde, urea, thio-urea, or their derivatives, Manufacture of condensation products from. F. Pollak. August 2, 1922.
 207,499. Formaldehyde condensation products of aliphatic amines, Manufacture of—and products obtained thereby. Naugatuck Chemical Co. November 27, 1922.
 209,757. Zinc sulphide, Manufacture of. Compagnie Generale des Produits Chimiques de Louvres. January 11, 1923.
 211,857. Ammonia from products containing alkali cyanides and complex cyanides, Process for the manufacture of. Naamlooze Vennootschap Stikstof Bindings Industrie Nederland. February 21, 1923.
 215,000. Diethyl sulphate from ethylene, Process for the preparation of. Ledoga Soc. Anon. and C. Maimeri. April 23, 1923.
 215,348. Malleable and ductile tungsten compound or alloy suitable for the manufacture of lighting bodies or filaments. British Thomson-Houston Co. May 1, 1923.
 222,602. Emulsive and deterrent agents, Manufacture of. W. E. Bellinghame. November 19, 1923.
 222,922. Metal catalyst, Apparatus for making. R. W. Barker (Vegetable Oil Securities Co.). July 3, 1923.
 222,947. Dyestuffs, Manufacture of. C. M. Barnard. July 10, 1923.
 223,015. Sodium carbonate, Manufacture of. H. E. Cocksedge. August 21, 1923.
 222,066. Hydrocarbons, Methods of refining. V. L. Oil Processes, Ltd., O. D. Lucas and E. L. Lomax. November 14, 1923.
 223,082. Barium cyanide, Process for the manufacture of. C. Deguide. December 10, 1923.
 212,864. Cellulose solution, Manufacture of. L. Lilienfeld. March 15, 1923.

Applications for Patents

- Bell's United Asbestos Co., Ltd. Sluice, etc., valves. 25,016. October 21.
 Bredig, G., and Elod, E. Production of hydrocyanic acid. 25,169. October 22. (December 1, 1923.)
 British Dyestuffs Corporation, Ltd., and Saunders, K. H. Manufacture of intermediate compounds and azo dyestuffs. 25,069. October 21.
 British Dyestuffs Corporation, Ltd., and Saunders, K. H. Manufacture of azo dyes. 25,152. October 22.
 Cox, K., and McDermott, P. J. Purification of benzol, etc. 25,038. October 21.
 Deutsche Gold- und Silber-Scheideanstalt vorm. Roessler. Manufacture of hydrogen cyanide. 25,147. October 22. (Germany December 2, 1922.)
 Dreyfus, H. Manufacture of cellulosic products. 25,462. 25,463. October 25.
 Fabrique Nationale de Produits Chimiques et d'Explosifs - Anciens Etablissements Ghinonnet et Deattre Soc. Anon. Manufacture of ammonia and ammonia compounds from cyanamides. 25,148. October 22. (Belgium, October 23, 1923.)
 Geidner, W., and Lumb, G. Dyeing machines. 25,330. October 24.
 Goodwin, H. Manufacture of azo dyes. 25,152. October 22.
 Harper, W. A., and Williams, W. M. Production of ammonia. 25,264. October 23.
 Johnson, J. Y., and Viscose Co. Apparatus for separating caustic hydroxides from solutions, etc. 25,290. October 23.
 Kelly, A. Acid-proof, etc., containers. 25,271. October 23.
 Langwell, H. Fermentation of cellulose materials. 25,275. October 23.
 Neill, O. S. Production of ferric oxide, etc. 25,382. October 24.
 Rigby, T. M. Rubber latex compositions, and application thereof. 24,970. October 21.
 Scottish Dyes, Ltd., Thomas, J., and Thomson, R. F. Manufacture of dyestuffs, etc. 25,033. October 21.
 Shearman, C. H. Refining fats, oils, etc. 25,337. October 24.
 Shearman, C. H. Destructive distillation of bones, etc. 25,338. October 24.
 Silica Gel Corporation. Refrigeration. 25,444. October 25. (United States, November 20, 1923.)

- Soc. des Appareils Magondeaux. Manufacture of granular cellulose and its application for storage of explosives gases, etc. 25,455. October 25. (France, November 20, 1923.)
 Soc. des Mines de Potasse d'Alsace, Amélie, Max, Joseph, Else, Théodore, Prince Eugène, Fernand (autrefois Reichsland) Anna, Marie, et Marie-Louise. Manufacture of magnesium sulphate. 25,424. October 25. (France, October 29, 1923.)
 Soc. of Chemical Industry in Basle. Manufacture of condensation products of the anthraquinone series. 24,954. October 20. (Switzerland, October 26, 1923.)
 Spencer, Chapman and Messel, Ltd. Manufacture and manipulation of colloidal substances, etc. 24,902. October 20.

Our Trade with Russia

MR. FREDERICK T. T. REYNOLDS, vice-chairman of the British Chemical and Dyestuffs Traders' Association, writing to the *Manchester Guardian*, draws attention to Board of Trade figures to show the great importance of Anglo-Russian trade both in relation to imports and to exports.

"The following summary may be of value to all who wish to ascertain the actual facts. For the purpose of correct comparison I give the totals for 1913 in relation to Russia as then existent and for 1920-24 for Russia and the Succession States:

Year.	Imports from Russia.	Exports from Russia.
	£	£
1913	40,271,000	18,103,000 *9,591,000
1920	33,523,000	11,992,000 *4,841,000
1921	14,948,000	11,579,000 *4,852,000
1922	26,657,000	11,101,000 *2,954,000
1923	36,155,000	11,761,000 *4,706,000
		16,467,000

* Re-exports.

1924 figures are only available for January-August, and only for shipment to and from present Russian ports:

Imports for the eight months	£10,594,983
Exports ditto	£1,357,783
Re-exports	5,174,589
	6,532,372

"Amongst the articles exported to Russia during the eight months may be mentioned machinery £355,243, chemicals £97,349, non-ferrous metals £440,805, wool £290,078, hides £498,777, and, most important of all, raw cotton £3,461,045. It is surely in the highest degree significant that in the first eight months of this year the total value of our re-exports to present Russian ports amounts to £5,174,589, and that so far no defaults have been reported."

Chemical Industry Club

THE annual meeting of the Chemical Industry Club was held on Monday, when it was announced that the president for the coming year is Mr. A. Chaston Chapman, F.R.S., in place of Sir William Pope, F.R.S., who retires. The other officers remain as before, but an election was held for four members of the executive committee to replace four retiring in rotation. As a result of this Mr. E. T. Brewis, F.I.C., takes the place of Mr. Ashley Carter. The announcement was made at the meeting that the charge for telephone calls made at the Club has now been reduced to 2d. This was received with acclamation. An interesting suggestion was made that a "round table" should be placed in the dining room so that members visiting the Club alone could sit there with the understanding that they would speak to others without introduction. A sub-committee was appointed to follow up this suggestion, which should do much to improve the social amenities of the Club for those members who are not regular clubmen. Another matter which received favourable comment was the greatly improved appearance of the premises now that the rooms have been redecorated.

London Chemical Market

The following notes on the London Chemical Market are specially supplied to THE CHEMICAL AGE by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing those firms' independent and impartial opinions.

London, October 30, 1924.

General Chemicals

QUITE an active business has been passing during the last week. The outlook remains hopeful and there seems to be a prospect of quite a considerable revival in trade if only the political conditions keep fairly stable.

Export business is fair, but without particular comment.

ACETONE.—The demand is slack and the market is a little easier. Price £93 to £94 per ton.

ACETIC ACID is inclined to be lower in price consequent upon heavy offering from abroad. The price is nominally unchanged at £44. per ton for technical 80% and £45 per ton for pure 80%.

ACID CITRIC.—Uninteresting.

ACID FORMIC is a fair market and price is unchanged at £53 per ton, ex wharf.

ACID LACTIC.—In fair demand. Price £43 to £44 per ton for 50% by weight.

ACID OXALIC has been in much better demand. The price of 4d. per lb. might be slightly shaded for quantities.

ACID TARTARIC.—Unchanged.

ALUMINA SULPHATE.—The market continues in buyers' favour owing to competition between foreign makers. Price unchanged at £7 5s. per ton for 17-18%.

ARSENIC is lifeless. Price nominally £44 per ton with Japanese offering, to arrive, at £36 10s. to £37 per ton.

BARIUM CHLORIDE.—In fair demand at about £12 10s. per ton.

COPPER SULPHATE.—Price is firm and rising in sympathy with the firmer tendency of the metal.

CREAM OF TARTAR.—Unchanged at about £80 per ton. The market shows a firm tendency.

FORMALDEHYDE is lower in price, the nominal figure to-day is £48 per ton, ex wharf, in casks.

EPSOM SALTS are higher in price. The demand is active, and price is about £4 per ton f.o.b.

LEAD ACETATE is higher in price, £46 per ton for white and £45 per ton for brown. A further advance is expected.

LEAD NITRATE.—The price to-day is £43 per ton.

LIME ACETATE is weak on forced realisations. Nominal price is £14 per ton for grey, and about £11 per ton for brown. The price of grey in particular is weak, and the above prices could be improved upon.

MAGNESIUM CHLORIDE.—Unchanged.

METHYL ALCOHOL is in fair and steady demand. Price about £60 per ton.

POTASH CAUSTIC.—Unchanged.

POTASSIUM BICHROMATE.—Unchanged.

POTASSIUM CARBONATE is a fair market at £23 to £24 per ton, c.i.f. U.K. ports.

POTASSIUM PERMANGANATE.—Price 7½d. per lb. ex wharf. Demand is quiet.

POTASSIUM PRUSSIAN is a firm market and is quoted at 7½d. to 8d. per lb.

SODIUM ACETATE is in fair demand. Price unchanged at about £22 10s. per ton.

SODIUM HYPOSULPHITE.—Unchanged, and in fair demand at about £9 5s. to £9 10s. per ton.

SODIUM NITRITE.—Unchanged at £24 15s. to £25 per ton.

SODIUM PRUSSIAN.—A much larger business is passing, and stocks are firmly held at about 4d. per lb.

SODIUM SULPHIDE.—Unchanged.

Coal Tar Products

The market generally in coal tar products maintains a fairly even tone, with no great change in values since last week.

90% BENZOL is firm at 1s. 4d. to 1s. 5d. per gallon on rails.

PURE BENZOL is worth from 1s. 7d. to 1s. 8d. per gallon on rails.

CREOSOTE OIL is quietly firm at 5½d. to 5½d. per gallon on rails in the North, and 6d. to 6½d. per gallon in the South.

CRESYLIC ACID is fairly plentiful, the pale quality, 97/99%, being quoted at 1s. 11d. per gallon on rails, while the dark quality, 95/97%, is quoted at 1s. 7d. to 1s. 7½d. per gallon on rails.

SOLVENT NAPHTHA is firm, and supplies for prompt delivery are somewhat short. Its value is from 1s. 1d. to 1s. 2d. per gallon on rails.

HEAVY NAPHTHA is also in fair demand, and is quoted at 11d. to 1s. per gallon on rails.

NAPHTHALENES of all grades are plentiful, the low qualities being quoted from £3 10s. to £4 10s. per ton, while of the higher grades, 76/78 quality is worth £6 to £6 10s. per ton, and 74/76, from £5 10s. to £6 per ton on rails.

PITCH is firm and prices are maintained. To-day's values are 45s. to 50s. f.o.b., London; 42s. 6d. to 45s. f.o.b. East and West Coast.

Nitrogen Products Market

THE demand for sulphate of ammonia for export has been quiet during the last week or two, but producers are holding firmly for £13 15s. per ton f.o.b. for prompt delivery, and £14 to £14 10s. for forward delivery in accordance with position.

As the producers carried over no stock from the last fertiliser year, it seems certain that there will be no reduction from these prices. Any unusual demand will result in their being raised.

At the moment there is considerable indication that the U.S. will be importers of sulphate of ammonia for this season. If this turns out to be correct a firmer market will result.

Home Trade.—The price for November is £14 6s. per ton and for December £14 8s. per ton for neutral quality basis 21.1 per cent. nitrogen delivered to consumer's nearest station.

At this season of the year there is little home demand. At present the producers are receiving orders for delivery between now and December 31. The home sales from June 1 up to date are 10,000 tons above those of last year.

It is certain that after December the prices will be gradually raised as the spring advances, the limit being reached in March/April/May.

Nitrate of Soda.—The market for nitrate of soda is quiet but firm. The price for near arrival is £11 13s. to £11 16s. per ton, with prices slightly in advance for forward shipment. The nitrate producers have made large sales for delivery up to March, 1925, and there is no prospect of weakening in this market.

Efficient Air Filtration

THE filtration of air to remove dust particles has many valuable applications in connection with ventilation, compressed air plant, etc., but it is never more essential than in drying plant where fine chemicals are produced which might be contaminated with extraneous matter. An interesting illustrated pamphlet has been issued by the Visco Engineering Co., Ltd., of 82, Victoria Street, London, S.W.1, describing the "Visco" air-filter, which is in many ways a superior and original production. In this device the air is drawn through a wire frame filled with short, hollow, cylindrical lead rings. Air can pass freely through the mass, but can hardly fail to come in contact with the metal, which is entirely coated with a special viscous oil which effectively traps any particles of dust.

German Rock Salt Syndicate

REPORTS from Germany state that the German Rock Salt Syndicate has been prolonged for three years. It embraces the most important works producing rock salt throughout the country, with the exception of certain State works in Prussia, which still hold out. Efforts are to be made to increase sales at home and abroad.

Weekly Prices of British Chemical Products

The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at sellers' works.

General Heavy Chemicals

Acid Acetic 40% Tech.—£23 10s. per ton.
 Acid Boric, Commercial.—Crystal, £45 per ton. Powder, £47 per ton.
 Acid Hydrochloric.—3s. 9d. to 6s. per carboy d/d., according to purity, strength and locality.
 Acid Nitric 80° Tw.—£21 10s. to £27 per ton, makers' works according to district and quality.
 Acid Sulphuric.—Average National prices f.o.r. makers' works, with slight variations up and down owing to local considerations: 140° Tw., Crude Acid, 65s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.
 Ammonia Alkali.—£6 15s. per ton f.o.r. Special terms for contracts.
 Bleaching Powder.—Spot, £11 d/d.; Contract, £10 d/d. 4 ton lots.
 Bisulphite of Lime.—£7 10s. per ton, packages extra.
 Borax, Commercial.—Crystal, £25 per ton. Powder, £26 per ton. (Packed in 2-cwt. bags, carriage paid any station in Great Britain.)
 Calcium Chloride.—£5 17s. 6d. per ton d/d.
 Copper Sulphate.—£25 per ton.
 Methylated Spirit 64 O.P.—Industrial, 2s. 7d. to 2s. 11d. per gall. Mineralised, 3s. 8d. to 4s. per gall., in each case according to quantity.
 Nickel Sulphate.—£38 per ton d/d. Normal business.
 Nickel Ammonia Sulphate.—£38 per ton d/d. Normal business.
 Potash Caustic.—£30 to £33 per ton.
 Potassium Bichromate.—5½d. per lb.
 Potassium Chlorate.—3d. to 4d. per lb.
 Sal ammoniac.—£32 per ton d/d.
 Salt Cake.—£3 10s. per ton d/d.
 Soda Caustic, Solid.—Spot lots delivered, £16 7s. 6d. to £19 7s. 6d. per ton, according to strength; 20s. less for contracts.
 Soda Crystals.—£5 5s. to £5 10s. per ton ex railway depots or ports.
 Sodium Acetate 97/98%.—£24 per ton.
 Sodium Bicarbonate.—£10 10s. per ton carr. paid.
 Sodium Bichromate.—4½d. per lb.
 Sodium Bisulphite Powder 60/62%.—£17 to £18 per ton, according to quantity, f.o.b., 1-cwt. iron drums included.
 Sodium Chlorate.—3d. per lb.
 Sodium Nitrate refined 96%.—£13 5s. to £13 10s. per ton, ex Liverpool. Nominal.
 Sodium Nitrite 100% basis.—£27 per ton d/d.
 Sodium Sulphide conc. 60/65.—About £14 10s. per ton d/d.
 Sodium Sulphide Crystals.—£9 per ton d/d.
 Sodium Sulphite, Pea Crystals.—£15 per ton f.o.r. London, 1-cwt. kegs included.

Coal Tar Products

Acid Carbolic Crystals.—6½d. per lb. Quiet. Crude 60's 1s. 8d. to 1s. 10d. per gall. Market flat.
 Acid Cresylic 97/99.—2s. to 2s. 1d. per gall. Demand steady.
 Pale 95%, 1s. 9d. to 2s. per gall. Better inquiry. Dark, 1s. 8d. to 1s. 10d. per gall.
 Anthracene Paste 40%.—4d. per unit per cwt. Nominal price. No business.
 Anthracene Oil, Strained.—6½d. to 7½d. per gall. Small demand. Unstrained, 6d. to 6½d. per gall.
 Benzol.—Crude 65's.—7½d. to 9d. per gall., ex works in tank wagons. Standard Motor, 1s. 1½d. to 1s. 3d. per gall., ex works in tank wagons. Pure, 1s. 5½d. to 1s. 7d. per gall., ex works in tank wagons.
 Toluol.—90%, 1s. 5d. to 1s. 5½d. per gall. Pure, 1s. 7d. to 1s. 9d. per gall. Small demand for home consumption.
 Xylol Commercial.—2s. 3d. per gall. Pure, 3s. 3d. per gall.
 Creosote.—Cresylic, 20/24%, 8d. to 8½d. per gall. Little demand. Middle Oil, Heavy, Standard specification, 5½d. to 6½d. per gall., according to quality and district. A little more demand for export in bulk.
 Naphtha.—Crude, 8d. to 9d. per gall. Solvent 90/160, 1s. to 1s. 3d. per gall. Demand good. Solvent 90/190, 11d. to 1s. per gall. Fair inquiry. Local demand good.
 Naphthalene Crude.—Demand rather better. Cheaper in Yorkshire than in Lancashire. Drained Creosote Salts, £3 to £5 per ton. Demand slightly better. Whizzed or hot pressed, £6 to £9 per ton. Demand very poor.
 Naphthalene.—Crystals and Flaked, £12 to £15 per ton, according to district.
 Pitch.—Medium soft, 42s. 6d. to 60s. per ton. Plenty of inquiry, prospects brighter. Price too low to interest distillers.
 Pyridine.—90/160, 19s. per gall. Steady demand. Heavy, 12s. to 12s. 6d. Market dull.

Intermediates and Dyes

Business in dyestuffs has been very well maintained this week. Slight reductions have been made in the price of a number of intermediates.

In the following list of Intermediates delivered prices include packages except where otherwise stated.

Acetic Anhydride 95%.—1s. 7d. per lb.
 Acid H.—3s. 11d. per lb. 100% basis d/d.
 Acid Naphthionic.—2s. 4d. per lb. 100% basis d/d.
 Acid Neville and Winther.—5s. 8d. per lb. 100% basis d/d.
 Acid Salicylic, technical.—1s. 1d. per lb. Improved demand.
 Acid Sulphanilic.—9d. per lb. 100% basis d/d.
 Aluminium Chloride, anhydrous.—1s. per lb. d/d.
 Aniline Oil.—8d. per lb. naked at works.
 Aniline Salts.—8½d. per lb. naked at works.
 Antimony Pentachloride.—1s. per lb. d/d.
 Benzidine Base.—3s. 11d. per lb. 100% basis d/d.
 Benzyl Chloride 95%.—1s. 1d. per lb.
 p-Chlorophenol.—4s. 3d. per lb. d/d.
 p-Chloraniline.—3s. per lb. 100% basis.
 o-Cresol 10/31° C.—4½d. per lb. Rather quiet.
 m-Cresol 98/100%.—2s. 1d. to 2s. 3d. per lb. Demand moderate.
 p-Cresol 32/34° C.—2s. 1d. to 2s. 3d. per lb. Demand moderate.
 Dichloraniline.—2s. 3d. to 3s. per lb.
 Dichloraniline S. Acid.—2s. 6d. per lb. 100% basis.
 p-Dichlorobenzol.—£85 per ton.
 Diethylaniline.—4s. 3d. per lb. d/d., packages extra, returnable.
 Dimethylaniline.—2s. 2½d. per lb. d/d. Drums extra.
 Dinitrobenzene.—9d. to 10d. per lb. naked at works.
 Dinitrochlorobenzol.—£84 10s. per ton d/d.
 Dinitrotoluene.—48/50° C. 8d. to 9d. per lb. naked at works. 66/68° C. 1s. 2d. per lb. naked at works.
 Diphenylaniline.—2s. 10d. per lb. d/d.
 Monochlorobenzol.—£63 per ton.
 B-Naphthol.—1s. per lb. d/d.
 a-Naphthylamine.—1s. 3½d. per lb. d/d.
 B-Naphthylamine.—4s. per lb. d/d.
 m-Nitraniline.—4s. 2½d. per lb. d/d.
 p-Nitraniline.—2s. 2½d. per lb. d/d.
 Nitrobenzene.—5½d. to 5½d. per lb. naked at works.
 o-Nitrochlorobenzol.—2s. per lb. 100% basis d/d.
 Nitronaphthalene.—10½d. per lb. d/d.
 p-Nitrophenol.—1s. 9d. per lb. 100% basis d/d.
 p-Nitro-o-amido-phenol.—4s. 6d. per lb. 100% basis.
 m-Phenylene Diamine.—3s. 10d. per lb. d/d.
 p-Phenylene Diamine.—10s. 2d. per lb. 100% basis d/d.
 R. Salt.—2s. 4d. per lb. 100% basis d/d.
 Sodium Naphthionate.—2s. 2d. per lb. 100% basis d/d.
 o-Toluidine.—10d. per lb.
 p-Toluidine.—3s. per lb. naked at works.
 m-Tolylene Diamine.—3s. 10d. per lb. d/d.

Wood Distillation Products

Acetate of Lime.—Brown £11 to £11 10s. per ton d/d. Grey £15 per ton. Liquor, 9d. per gall. 32° Tw.
 Charcoal.—£7 15s. to £9 5s. per ton, according to grade and locality. Demand quiet, but price steady.
 Iron Liquor.—1s. 7d. per gall. 32° Tw. 1s. 2d. per gall. 24° Tw.
 Red Liquor.—10d. to 1s. per gall. 14/15° Tw.
 Wood Creosote.—2s. 9d. per gall. Unrefined.
 Wood Naphtha, Miscible.—4s. 9d. per gall. 60% O.P. Market dull. Solvent, 5s. 6d. per gall. 40% O.P. Firmer.
 Wood Tar.—£4 5s. per ton. Very quiet.
 Brown Sugar of Lead.—£43 per ton. Cheaper.

Rubber Chemicals

Antimony Sulphide.—Golden, 6½d. to 1s. 2d. per lb., according to quality. Crimson, 1s. 4d. to 1s. 6d. per lb., according to quality.
 Arsenic Sulphide, Yellow.—1s. 11d. per lb.
 Barytes.—£3 10s. to £6 15s. per ton, according to quality.
 Cadmium Sulphide.—3s. 9d. to 4s. per lb., according to quantity.
 Carbon Bisulphide.—£30 to £33 per ton, according to quantity. Again dearer.
 Carbon Black.—7d. to 7½d. per lb., ex-wharf. Dearer.
 Carbon Tetrachloride.—£60 to £65 per ton, according to quantity, drums extra. Again dearer.
 Chromium Oxide, Green.—1s. 3d. per lb.
 Indiarubber Substitutes, White and Dark.—5d. to 9½d. per lb. Demand very brisk. Prices likely to remain steady owing to firmness of rapeseed oils.
 Lamp Black.—£48 per ton, barrels free.
 Lead Hyposulphite.—7½d. per lb.
 Lithopone, 30%.—£22 10s. per ton.
 Mineral Rubber "Rubpron."—£16 5s. per ton f.o.r. London.

Sulphur.—£10 to £12 per ton, according to quality.
Sulphur Chloride.—4d. per lb., carboys extra. Dearer.
Sulphur Precip. B.P.—£47 10s. to £52 10s. per ton according to quantity.

Thiocarbamide.—2s. 6d. per lb.
Vermilion, Pale or Deep.—5s. 1d. per lb. Dearer.
Zinc Sulphide.—7½d. to 1s. 8d. per lb., according to quality

Pharmaceutical and Photographic Chemicals

Acid, Acetic 80% B.P.—£47 per ton. Firmer.
Acid, Acetyl Salicylic.—3s. 1d. to 3s. 3d. per lb., according to quantity. Sales steady. Price firm.
Acid, Benzoic B.P.—2s. 6d. per lb. Cheaper.
Acid, Boric B.P.—Crystal £51 per ton, Powder £55 per ton. Carriage paid any station in Great Britain.
Acid, Camphoric.—19s. to 21s. per lb.
Acid, Citric.—1s. 3½d. to 1s. 4d. per lb., less 5% for ton lots. Market still weak.
Acid, Gallic.—2s. 9d. per lb. for pure crystal, in 2 cwt. lots.
Acid, Pyrogallol, Crystals.—6s. 9d. per lb. for 1 cwt. lots. Market firm. Increasing demand.
Acid, Salicylic.—1s. 6d. to 1s. 8d. per lb., according to quantity.
Acid, Tannic B.P.—2s. 10d. per lb. Market quiet.
Acid, Tartaric.—1s. per lb., less 5%.
Amidol.—9s. per lb. d/d.
Acetanilide.—2s. per lb. for quantity. More inquiry.
Amidopyrin.—15s. per lb. for spot stocks.
Ammonium Benzoate.—3s. 3d. to 3s. 6d. per lb., according to quantity.
Ammonium Carbonate B.P.—£37 per ton.
Atropine Sulphate.—12s. 6d. per oz. for English make.
Barbitone.—14s. 3d. per lb. Cheaper.
Benzonaphthol.—5s. 3d. per lb. Small inquiry.
Bismuth Salts.—Prices reduced by about 1s. 3d. to 2s. 3d. per lb. on account of the fall in the price of the metal.
Bismuth Carbonate.—10s. 6d. to 12s. 6d. per lb.
Bismuth Citrate.—10s. 3d. to 12s. 3d. per lb.
Bismuth Salicylate.—9s. 6d. to 11s. 6d. per lb.
Bismuth Subnitrate.—9s. 8d. to 10s. 8d. per lb.
Borax B.P.—Crystal £29, Powder £30 per ton. Carriage paid any station in Great Britain.
Bromides.—Potassium, 1s. 6d. to 1s. 9d. per lb.; sodium, 1s. 7d. to 1s. 10d. per lb.; ammonium, 1s. 8d. to 1s. 11d. per lb. Market firm and prices advancing. Raw materials dearer.
Calcium Lactate.—1s. 6d. to 1s. 8d., according to quantity. Fair demand and steady market.
Chloral Hydrate.—4s. to 4s. 3d. per lb. Slightly dearer. Spot supplies short.
Chloroform.—2s. 6d. per lb. for cwt. lots. Price advanced by 6d. per lb.
Creosote Carbonate.—6s. 6d. per lb. Little demand.
Formaldehyde.—£48 to £49 per ton, in barrels ex wharf London.
Glycerophosphates.—Fair business passing. Calcium, soluble and citrate free, 7s. per lb.; iron, 8s. 9d. per lb.; magnesium, 9s. per lb.; potassium, 50%, 3s. 6d. per lb.; sodium, 50%, 2s. 6d. per lb.
Guaiacol Carbonate.—10s. per lb.
Hexamine.—3s. per lb. Forward prices higher.
Homatropine Hydrobromide.—30s. per oz.
Hydrastine Hydrochloride.—English make offered at 120s. per oz.
Hydroquinone.—4s. 3d. per lb. in cwt. lots. Foreign make.
Hypophosphites.—Calcium, 3s. 6d. per lb., for 28 lb. lots; potassium, 4s. 1d. per lb.; sodium, 4s. per lb.
Iron Ammonium Citrate B.P.—2s. 1d. to 2s. 5d. per lb., according to quantity.
Magnesium Carbonate.—Light Commercial, £36 per ton net.
Magnesium Oxide.—Light Commercial, £75 per ton, less 2½%; Heavy Commercial, £25 per ton, less 2½%; Heavy Pure, 1s. 6d. to 2s. per lb., according to quantity. Steady market.
Menthol.—A.B.R. recrystallised B.P., 60s. per lb. Market much firmer. Synthetic, 26s. to 35s. per lb. Increasing demand.
Mercurials.—Market very quiet. Red oxide, 5s. 3d. to 5s. 4d. per lb.; Corrosive sublimate, 3s. 6d. to 3s. 7d. per lb.; white precipitate, 4s. 7d. to 4s. 8d. per lb.; Calomel, 3s. 11d. to 4s. per lb.
Methyl Salicylate.—1s. 10d. to 2s. per lb. Seasonal increase in demand.
Methyl Sulphonol.—24s. per lb. Slightly weaker.
Metol.—11s. per lb. British make.
Morphine and Salts.—Reduced by 1s. to 1s. 3d. per oz.
Paraformaldehyde.—2s. 8d. for B.P. Quality.
Paraldehyde.—1s. 4d. to 1s. 6d. per lb., in free bottles and cases. Supplies plentiful.
Phenacetin.—5s. 9d. per lb.
Phenazone.—6s. 9d. per lb. Slightly lower, supply exceeds demand.
Phenolphthalein.—5s. 9d. per lb.
Potassium Bitartrate 99/100% (Cream of Tartar)—88s. per cwt. less 2½% for ton lots. Firm market. Prices have upward tendency.
Potassium Citrate.—1s. 10d. to 2s. 2d. per lb. Dearer.
Potassium Ferricyanide.—1s. 9d. per lb. Quiet.
Potassium Iodide.—16s. 8d. to 17s. 5d. per lb., according to quantity. Good steady demand.

Potassium Metabisulphite.—7½d. per lb., 1-cwt. kegs included, f.o.r. London.

Potassium Permanganate.—B.P. crystals, 7½d. per lb., carriage paid; commercial, 8d. to 8½d. per lb., carriage paid. Forward prices higher.

Quinine Sulphate.—2s. 3d. to 2s. 4d. per oz., in 100 oz. tins. Good market.

Resorcin.—5s. 3d. to 5s. 6d. per lb.
Saccharin.—63s. per lb. in 50-lb. lots.

Salol.—3s. 9d. per lb., for cwt. lots.

Silver Proteinate.—9s. per lb. for satisfactory product light in colour.
Sodium Benzoate, B.P.—2s. 6d. per lb. Ample supplies of good quality available.

Sodium Citrate, B.P.C., 1923.—1s. 11d. to 2s. 2d. per lb., according to quantity.

Sodium Hypophosphite, Photographic.—£13 to £15 per ton, according to quantity, d/d. consignee's station in 1-cwt. kegs.

Sodium Metabisulphite Crystals.—37s. 6d. to 60s. per cwt., net cash, according to quantity.

Sodium Nitroprusside.—16s. per lb. Less for quantity.

Sodium Potassium Tartrate (Rochelle Salt).—75s. to 82s. 6d. per cwt., according to quantity. Market steady, good demand.

Sodium Salicylate.—Powder, 2s. to 2s. 3d. per lb. Crystal, 2s. 2d. to 2s. 5d. per lb. Flake, 2s. 6d. per lb.

Sodium Sulphide, pure recrystallised.—10d. to 1s. 2d. per lb., according to quantity.

Sodium Sulphite, anhydrous, £27 10s. per ton, minimum 5 ton lots, according to quantity, 1 cwt. kegs included.

Sulphonol.—15s. 6d. per lb. Little demand.

Thymol.—16s. per lb.

Perfumery Chemicals

Acetophenone.—12s. per lb.

Aubepine.—15s. 3d. per lb. Advanced.

Amyl Acetate.—2s. 9d. per lb. Dearer.

Amyl Butyrate.—6s. 9d. per lb.

Amyl Salicylate.—3s. 3s. per lb. Dearer.

Anethol (M.P. 21/22° C.).—4s. 6d. per lb.

Benzyl Acetate from Chlorine-free Benzyl Alcohol.—2s. 9d. per lb.

Benzyl Alcohol free from Chlorine.—2s. 9d. per lb.

Benzaldehyde free from Chlorine.—3s. 6d. per lb.

Benzyl Benzoate.—3s. 6d. per lb.

Cinnamic Aldehyde Natural.—18s. 9d. per lb. Advanced.

Coumarin.—19s. 6d. per lb. Cheaper.

Citronellol.—17s. per lb. Again advanced.

Citral.—8s. per lb. Cheaper.

Ethyl Cinnamate.—12s. 6d. per lb. Cheaper.

Ethyl Phthalate.—3s. 3d. per lb.

Eugenol.—10s. per lb. Cheaper.

Geraniol (Palmarosa).—33s. 6d. per lb.

Geraniol.—11s. 6d. to 18s. 6d. per lb.

Heliotropine.—6s. 9d. per lb. Cheaper.

Iso Eugenol.—15s. 9d. per lb.

Linalol ex Bois de Rose.—26s. per lb.

Linalyl Acetate.—26s. per lb.

Methyl Anthranilate.—9s. 6d. per lb.

Methyl Benzoate.—5s. per lb.

Musk Ambrette.—50s. per lb. Dearer.

Musk Xylol.—13s. 6d. per lb. Again cheaper.

Nerolin.—4s. 9d. per lb. Advanced.

Phenyl Ethyl Acetate.—15s. per lb. Advanced.

Phenyl Ethyl Alcohol.—16s. per lb.

Rhodiol.—55s. per lb. Cheaper.

Safrol.—1s. 10d. per lb.

Terpineol.—2s. 4d. per lb. Cheaper.

Vanillin.—25s. 6d. per lb.

Essential Oils

Almond Oil, Foreign S.P.A.—15s. 6d. per lb.

Anise Oil.—2s. 8d. per lb.

Bergamot Oil.—16s. 6d. per lb.

Bourbon Geranium Oil.—33s. 6d. per lb. Cheaper.

Camphor Oil.—65s. per cwt.

Cananga Oil, Java.—10s. per lb. Cheaper.

Cinnamon Oil, Leaf.—6½d. per oz.

Cassia Oil, 80/85%.—10s. per lb. Dearer.

Citronella Oil.—Java, 85/90%, 5s. 10½d. per lb. Ceylon, 3s. 8d. per lb. Dearer.

Clove Oil.—7s. 9d. per lb. Dearer.

Eucalyptus Oil, 70/75%.—2s. 3d. per lb. Cheaper.

Lavender Oil.—French 38/40% Esters, 32s. 6d. per lb.

Lemon Oil.—3s. per lb.

Lemongrass Oil.—4s. 6d. per lb.

Orange Oil, Sweet.—11s. per lb.

Otto of Rose Oil.—Bulgarian, 40s. per oz. Dearer. Anatolian, 18s. per oz.

Palma Rosa Oil.—16s. 6d. per lb. Cheaper.

Peppermint Oil.—Wayne County, 30s. per lb. Japanese, 18s. 6d. per lb. Practically unobtainable for spot or near delivery. English, 70s. per lb.

Petitgrain Oil.—9s. 3d. per lb.

Sandal Wood Oil.—Mysore, 26s. 7d. per lb. Australian, 18s. 6d. per lb.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to THE CHEMICAL AGE by Messrs. Charles Tennant & Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.

Glasgow, October 30, 1924.

BUSINESS in the heavy chemical market remains quiet, and there is nothing of importance to record. Prices both for continental and home manufactured products are on about the same level as last reported.

Industrial Chemicals

ACID ACETIC.—Glacial, 98/100%, £57 to £68 per ton; 80% pure, £45 to £47 per ton; 80% technical, £44 to £46 per ton. All packed in casks, delivered c.i.f., U.K. ports, duty free.

ACID BORACIC.—Remains unchanged, crystal or granulated, £45 per ton; powdered, £47 per ton, carriage paid, U.K. stations, minimum ton lots.

ACID CARBOLIC, ICE CRYSTALS.—Practically no demand. Now quoted 5½d. per lb., delivered, but could probably be obtained for less.

ACID CITRIC, B.P. CRYSTALS.—Unchanged at about 1s. 3½d. per lb., less 5%, ex store. Offered for early delivery at about 1s. 3d. per lb. less 5%, ex wharf.

ACID FORMIC, 85%.—Spot material on offer at about £54 per ton, ex store. Quoted £50 to £51 per ton, c.i.f., U.K. ports, duty free.

ACID HYDROCHLORIC.—In little demand. Price 6s. 6d. per carboy, ex works.

ACID NITRIC, 80%.—£23 10s. per ton, ex station, full truck loads.

ACID OXALIC, 98/100%.—Quoted for prompt shipment from the continent 3½d. per lb., c.i.f., U.K. port. Spot lots now quoted 3½d. per lb., ex store.

ACID SULPHURIC.—144°, £3 12s. 6d. per ton; 168°, £7 per ton, ex works, full truck loads. Dearsenicated quality, 20s. per ton more.

ACID TARTARIC, B.P. CRYSTALS.—Spot material available at about 1s. per lb., less 5%, ex store. Offered for prompt shipment at 11½d. per lb., less 5%, ex wharf.

ALUMINA SULPHATE, 17/18% IRON FREE.—Quoted £6 17s. 6d. per ton, c.i.f., U.K. port, prompt shipment. Spot lots available at about £7 17s. 6d. per ton, ex store.

ALUM.—Ammonium chrome alum, £18 to £20 per ton, according to quality, f.o.b. U.K. port. Lump potash alum slightly higher at about £9 15s. per ton, ex store. Offered for prompt shipment from the continent at £8 7s. 6d. per ton, c.i.f. U.K. port.

AMMONIA ANHYDROUS.—Unchanged at about 1s. 6d. per lb., ex station. Containers extra and returnable, with possible slight reduction for large quantities.

AMMONIA CARBONATE.—Lump, £37 per ton; powdered, £39 per ton, packed in 5 cwt. casks, delivered U.K. port.

AMMONIA LIQUID, 880°.—In steady demand. Unchanged at 2½d. to 3d. per lb., delivered, according to quantity, containers extra.

AMMONIA MURIATE.—Gray galvanizers' crystals of English manufacture unchanged at £30 per ton, ex station. On offer from the continent at about £28 7s. 6d. per ton, c.i.f. U.K. port. Fine white crystals offered from the continent at £24 10s. per ton, c.i.f. U.K. port.

ARSENIC, WHITE POWDERED.—Practically no demand. Spot lots quoted £47 to £48 per ton, ex store, but this price merely nominal. Foreign arsenic on offer at about £33 to £34 per ton, c.i.f. U.K. port, prompt shipment.

BARIUM CARBONATE.—98/100%, powdered, offered from the continent at £9 15s. per ton, c.i.f. U.K. port.

BARIUM CHLORIDE, 98/100%.—Offered from the continent at £11 15s. per ton, c.i.f. U.K. port. Spot material on offer at about £13 per ton, ex store.

BARYTES.—English material unchanged at £5 5s. per ton, ex works. Continental quoted £5 per ton, c.i.f. U.K. port.

BLEACHING POWDER.—Spot lots £11 per ton, ex station. Contracts 20s. per ton less.

BORAX.—Granulated, £24 10s. per ton; crystals, £25 per ton; powdered, £26 per ton, carriage paid U.K. stations, minimum ton lots.

CALCIUM CHLORIDE.—English material unchanged at £5 12s. 6d. per ton, ex station. On offer from the continent at about £4 17s. 6d. per ton, c.i.f. U.K. port.

COPPERAS, GREEN.—Unchanged at about £3 5s. per ton, ex works, packed in casks, free.

COPPER SULPHATE.—English material quoted £25 per ton, f.o.b. U.K. port, for export. Continental on offer at about £24 per ton, ex wharf.

FORMALDEHYDE, 40%.—Nominally, £50 per ton, ex store, but could probably be bought for less.

GLAUBER SALTS.—English material unchanged at £4 per ton, ex store or station. Fine white crystals on offer from the continent at about £3 per ton, c.i.f. U.K. port. Large crystals, 17s. 6d. per ton extra.

LEAD, RED.—Imported material advanced to about £43 per ton, ex store.

LEAD, WHITE.—Now quoted £45 per ton, ex store, spot delivery.

LEAD ACETATE.—White crystals quoted £46 per ton, ex store, spot delivery. Offered from the continent at about £43 12s. 6d. per ton, c.i.f. U.K. port. Brown quoted £40 5s. per ton, c.i.f. U.K. port.

MAGNESITE, CALCINED.—Unchanged at about £7 17s. 6d. per ton, ex station, prompt delivery. Hard burnt quality quoted £4 15s. per ton, ex station. Finer quality of continental manufacture quoted £7 15s. per ton, c.i.f. U.K. port.

MAGNESIUM CHLORIDE.—Continental quotations vary greatly. Price about £4 15s. per ton, c.i.f. U.K. port.

POTASH CAUSTIC, 88 92%.—Continental offers advanced to about £31 per ton, c.i.f. U.K. port. Spot lots on offer at about £31 15s. per ton, ex store.

POTASSIUM BICHROMATE.—Unchanged at 5½d. per lb. delivered.

POTASSIUM CARBONATE, 96 98%.—Quoted £22 17s. 6d. per ton, c.i.f. U.K. port, prompt shipment. Spot lots unchanged at about £24 15s. per ton, ex store.

POTASSIUM CHLORATE.—Unchanged at about 2½d. per lb., ex wharf, prompt shipment from the continent. Spot lots available at about the same figure.

POTASSIUM NITRATE, SALTPETRE.—Quoted £26 per ton, c.i.f. U.K. port, prompt shipment from the continent. Spot lots on offer at £28 15s. per ton, ex store.

POTASSIUM PERMANGANATE, B.P. CRYSTALS.—Quoted 8d. per lb., ex store, spot delivery. Offered for prompt shipment from the continent at about 7½d. per lb., ex wharf.

POTASSIUM PRUSSIAN, YELLOW.—In little demand and obtainable at about 6½d. per lb., ex store, spot delivery. Offered for prompt shipment from the continent at about 6½d. per lb., c.i.f. U.K. port.

SODA CAUSTIC.—76/77%, £19 7s. 6d. per ton; 70/72%, £17 17s. 6d. per ton; 60/62% broken £19 2s. 6d. per ton; 98/99%, powdered, £22 15s. per ton. All ex station, spot delivery. Contracts 20s. per ton less.

SODIUM ACETATE.—Slightly higher quotations from the Continent. Now quoted £22 10s. per ton, c.i.f. U.K. port. Spot lots quoted £23 15s. per ton, ex store.

SODIUM BICARBONATE.—Refined recrystallised quality, £10 10s. per ton, ex quay or station. M.W. quality 30s. per ton less.

SODIUM BICHROMATE.—Unchanged at 4½d. per lb. delivered.

SODIUM CARBONATE, SODA CRYSTALS.—£5 to £5 5s. per ton, ex quay or station. Powdered or pea quality, £1 7s. 6d. per ton more. Alkali 58%, £8 12s. 3d. per ton, ex quay or station.

SODIUM HYPOSULPHITE.—English material unchanged at £10 per ton, ex station. Continental quoted £8 10s. per ton c.i.f. U.K. port. Spot lots available at about £9 15s. per ton, ex store. Pea crystals of English manufacture unchanged at £13 15s. per ton, ex station.

SODIUM NITRATE.—Ordinary quality, quoted £13 17s. 6d. per ton, ex store; 96/98%, refined quality, 7s. 6d. per ton extra.

SODIUM NITRITE, 100%.—Unchanged at about £26 per ton, ex store.

SODIUM PRUSSIAN, YELLOW.—Quoted 4d. per lb., ex store, spot delivery, but in little demand.

SODIUM SULPHATE, SALTCAKE.—Price for home consumption £3 10s. per ton f.o.b. works. Good inquiry for export.

SODIUM SULPHIDE.—60/65% solid, of English manufacture, £14 15s. per ton, ex station. Broken £1 per ton more. Flake, £2 per ton more. 60/62% solid of continental manufacture, now quoted £12 17s. 6d. per ton c.i.f. U.K. port. Broken £1 per ton more. 31/34% crystals of English manufacture £9 2s. 6d. per ton ex station. 30/32% crystals of continental manufacture quoted £8 15s. per ton c.i.f. U.K. port.

SULPHUR.—Flowers, £9 10s. per ton; roll, £8 10s. per ton; rock, £8 7s. 6d. per ton; ground, £8 5s. per ton; ex store, prices nominal.

ZINC CHLORIDE.—98/100%, solid, offered from the continent at about £24 5s. per ton c.i.f. U.K. port. 96/98% quoted £23 10s. per ton c.i.f. U.K. port. English material for export about £26 per ton f.o.b. U.K. port.

ZINC SULPHATE.—Spot lots now quoted £12 15s. per ton, ex store. On offer from the continent at about £11 15s. per ton c.i.f. U.K. port.

NOTE.—The above prices are for bulk business, and are not to be taken as applicable to small parcels.

Coal Tar Intermediates and Wood Distillation Products

ANILINE OIL.—Export inquiries. Price 8½d. per lb., drums included, f.o.b.

BETA NAPHTHOL.—Some home inquiries. Price 1s. per lb. f.o.b.

CASSELLA F ACID.—Some home inquiry. Price 10s. per lb., 100% basis, carriage paid.
 DINITRO TOLUENE.—Considerable export inquiry. Price 9d. per lb., f.o.b.
 DINITRO BENZOL.—Some home inquiry. Price 10d. per lb., delivered.
 DIMETHYLANILINE.—Home and export inquiries. Price 2s. 2d. per lb., delivered or f.o.b.
 GAMMA ACID.—Export inquiry. Price 10s. per lb. f.o.b., 100% basis.
 META PHENYLENE DIAMINE.—Some export inquiry. Price 3s. 10d. per lb. f.o.b.
 NAPHTHONATE OF SODA.—Small export inquiry. Price 2s. 2d. per lb., 100% basis, f.o.b.
 NITRO NAPHTHALENE.—Home inquiry. Price 9½d. per lb. delivered.
 ORTHO NITRO ANISOL.—Export inquiry. Price 4s. 6d. per lb. f.o.b.
 SCHAEFFER SALT.—Some home inquiry. Price 3s. 9d. per lb., 100% basis, carriage paid.

The Manchester Chemical Market

(FROM OUR OWN CORRESPONDENT.)

Manchester, October 30, 1924

THE position on the chemical market here is much the same as at last report. A quiet but fairly steady demand for the leading lines of heavies for home consumption is being experienced, and rather more interest is being displayed in forward positions. As far as prices are concerned few alterations have occurred since last week, values on the whole being pretty well maintained. Export business is not particularly brisk, though shipments have been made to the East and, among the colonies, to Canada and Australia, with the Continent and the United States taking a few small parcels.

Heavy Chemicals

Saltcake remains a slow section of the market, with values quotably unchanged at £3 10s. per ton. Glauber salts are offering also at about this figure but the demand is poor. Caustic soda continues to offer at from £16 17s. 6d. per ton for 60 per cent. material to £19 7s. 6d. for 76-77 per cent. strength, a fair amount of business for both branches of trade being put through. Bleaching powder meets with a moderate demand and values are maintained at round £10 per ton. Hyposulphite of soda is quiet and easy at £13 15s. to £14 per ton for photographic crystals and round £9 for commercial quality. Sulphide of sodium sells slowly though prices are steady at £14 5s. to £14 10s. per ton for 60-65 per cent. concentrated solid and £9 5s. for crystals. Alkali is well maintained at £6 15s. per ton, a quietly steady demand being met with. Acetate of soda is steady and in moderate request at £22 10s. per ton. Soda crystals are still rather quiet at £5 5s. per ton. Prussiate of soda is steadier at 3½d. per lb., and a little more business in this material has been done. The demand for chlorate of soda is not too brisk though values have been maintained at last week's level of 2½d. per lb. Bicarbonate of soda is selling only in comparatively small quantities at £10 10s. per ton. Phosphate of soda is quiet but fairly steady at round £13 5s. per ton. Bichromate of soda is in moderate inquiry and unchanged in value at 4½d. per lb.

Caustic potash has met with a quiet demand with prices steady at £29 to £30 per ton for 90 per cent. material. Carbonate of potash is in much the same position, the current quotation ranging from £22 to £23 per ton. Yellow prussiate of potash is still offering at 6½d. per lb., and some sellers have met with a slightly better demand. Permanganate of potash has been in rather improved inquiry and values have firmed up a little at from 6½d. to 7½d. per lb. according to quality. Chlorate of potash continues quiet, though the price is unchanged at 2½d. per lb. Bichromate of potash is in moderate request at 5½d. per lb.

With a persistent weak demand and in the face of offers of cheap Japanese arsenic, Cornish makes show continued weakness, white powdered now being quoted at about £44 per ton in Manchester. Sulphate of copper is steady and a shade more active at £24 10s. to £25 per ton, f.o.b. Acetate of lead is firm in sympathy with the metal; white is offering at £46 per ton and brown at £42 to £43 per ton. Nitrate of lead is in quiet demand at round £42 per ton. Acetate of

lime is rather inactive and values have an easy tendency at £15 per ton for grey and £11 for brown. Commercial Epsom salts are steady and in moderate inquiry at £4 15s. to £5 per ton; magnesium sulphate, B.P., is quoted at about £6 10s.

Acids and Tar Products

Tartaric acid is quiet and easy at 1s. per lb. Citric acid is in much the same position at about 1s. 3d. per lb. Acetic acid is steady and in fair demand at £44 per ton for 80 per cent. commercial and £68 to £69 per ton for glacial. Oxalic acid is dull and weak at 3½d. to 4d. per lb.

Carbolic acid still attracts small attention and values are more or less nominal at 6d. per lb. for crystals and 1s. 10d. per gallon for crude. Pitch is quiet but slightly steadier at 42s. 6d. to 45s. per ton. Creosote oil is inactive but unchanged at 5½d. per gallon. Refined naphthalene is on offer at £15 per ton with crude qualities ranging from £5 per ton upwards; demand is slow. Solvent naphtha is still in small request though the price is stronger at about 1s. 3d. per gallon. Cresylic acid is fairly steady at 2s. to 2s. 1d. per gallon.

American Market Movements

(From Drug and Chemical Markets.)

INDUSTRIALS continue to pursue a steady course with buying conservative and prices generally unchanged. With the formation of a German export selling association caustic potash prices have been advanced. Imported sodium nitrite is selling at higher levels. Improved buying is reported in dyes and intermediates with prices holding at recent quotations. Benzol supplies continue scarce and sales are being made at slightly higher prices for prompt shipment. Phenol prices are firmer. Cresylic acid is being offered at concessions. Advances in animal and vegetable oils have featured the oil market. Linseed oil has been advanced 3c. gal. Corn and cottonseed oils are higher. Tallow is strong with an upward tendency. Palm oil supplies are small and prices higher. Turpentine down. Rosins are up.

A sharp advance in all alcohol prices of five cents per gallon featured a quiet fine chemical market this week. American refiners of camphor have reduced prices to eighty cents and are still well above the price for Japanese goods. Thymol crystals are held at five dollars per pound and difficult to find at any price. Quicksilver has moved slightly lower again.

Essential oil prices continue an upward trend this week with demand steady. Holders of peppermint oil in the Middle West are still bullish and prices are higher in New York. Scarcity of codliver oil has brought further advances in price. An easing off in demand for crude drugs has brought some lower prices this week. Rio ipecac is in slightly better supply and easier. Insect powder is easier for shipment. Cascara sagrada is easier and lower on spot. The firmness of rhubarb root continues to maintain prices.

Supplies of Nigrosine

IN case the impression should be conveyed by our note last week in the section dealing with "What British Dyestuffs Firms are Doing" that Williams Brothers and Co., of Hounslow, cater mainly for the small retailer we are asked to point out that many of the firm's products are supplied in large quantities. They state that "in the case of Nigrosine alone we are supplying practically all users of this product comprising most of the largest firms in the leather, boot polish and printing ink trades. The point we wish to emphasise is that we are perfectly willing to devote equal attention to matching samples where we know that only small quantities will come into question."

Suggested German Dye Fusion

REPORTS from Germany state that negotiations have been commenced for effecting a fusion into one large company of all the aniline works which now constitute the I.G. It is suggested that this step is necessitated by the prospect of an alliance between French or American dye industries and the Swiss industry.

Company News

AYRTON SAUNDERS AND CO.—The dividend on the 7½ per cent. preference shares is payable (less tax) to-day, November 1.

BORAX CONSOLIDATED, LTD.—An interim dividend of 1s. per share has been declared, less tax, on the deferred ordinary shares, in respect of the year ending September 30 last.

AGUAS BLANCAS NITRATE CO., LTD.—The directors have declared an interim dividend of 25 per cent., less tax, on account of the year 1924, payable on November 20.

LEEDS FIRECLAY CO.—The net profit for the year ended June 30 last was £30,827 after providing for debenture interest. A dividend of 5 per cent. is proposed, carrying forward £9,704.

CASTNER-KELLNER ALKALI CO., LTD.—The directors recommend the payment of a final dividend at the rate of 14 per cent., subject to tax, making with the interim dividend paid in May last 22 per cent. for the year ended September 30, 1924, payable on November 5.

THE ANGLO-CHILIAN NITRATE AND RAILWAY CO., LTD.—An interim dividend is announced on account of the year 1924 of 2s. per preference share and 2s. per ordinary share, both less tax, being 10 per cent. on each class of share, payable on November 19 to shareholders on the share register on October 31.

DUCKTOWN SULPHUR AND IRON CO.—The report for the year 1923 states that the balance transferred from mines revenue account shows a profit of £1,542, and interest, etc., amounted to £1,823. After allowing for management and other charges in London, interest on debentures and loans, there is debit balance of £8,373, which, with amount written off for depreciation, £4,000, makes a total loss for the year of £12,373, and increasing debit balance to £43,861.

NORTH BROKEN HILL CO.—The net profit for the year ended June 30 last is returned at £685,794. To this amount is added £27,409, the appropriation for new plant unexpended at the end of the year, making an available total of £713,203. The balance brought forward of £69,447 has been transferred to general reserve. Dividends declared absorb £340,000; debenture sinking fund, £13,333; and appropriation for plant expenditure £50,000, leaving a balance of £309,870.

LAGUNAS SYNDICATE.—It is announced that the directors having been debarred by the company's obligations to its debenture-holders from paying any dividends to the shareholders for some years, propose to ask the debenture-holders to agree to a modification of those obligations. In return for this concession the company would at once redeem at par about a third of the outstanding debentures and increase the interest on the balance to 6 per cent., whilst guaranteeing to redeem the whole issue within 10 years. A meeting of the debenture-holders has been called for Tuesday, November 4 next, at 12 o'clock, at Winchester House, London E.C.

ERINOID, LTD.—The trading profits for the year ended August 31 last amounted to £36,812, and, after allowing for company charges, depreciation of plant, etc., the net profits are £27,171, which, together with the amount brought forward from 1923 (after deduction of corporation profits tax), leaves a balance of £33,589. The directors recommend the payment of a dividend at the rate of 7 per cent., less tax; that £10,000 should be placed to general reserve and £4,000 reserved for income tax, leaving £6,497 to be carried forward.

Tariff Changes

CZECHO-SLOVAKIA.—The National Assembly has given its approval to the proposed commercial treaty with Italy, subject to certain terms, and has decided to impose duties on artificial silk and aniline dyes which have hitherto been free.

AUSTRALIA.—Dumping duties are applied to caustic soda when the landed duty-paid cost is less than the manufacturer's selling price of comparable Australian-made articles. The exportation of various arms and ammunition is prohibited under certain conditions.

ST. CHRISTOPHER AND NEVIS.—A Tariff Amendment Ordinance provides for the duty-free importation of salt produced in the British Empire and for the imposition of the following import duties on foreign salt:—Coarse or rock salt, 35s. per ton; fine salt, including table salt, 3s. 1½d. per 100 lb. Hitherto salt of any origin imported into the colony was duty free.

HUNGARY.—Sugar and alcohol may now be exported without licence.

ITALY.—A list of goods the importation of which is prohibited includes explosives, sulphur, and glassware for laboratories. This prohibition, however, does not apply to goods from the United Kingdom.

JAPAN AND KOREA.—An Ordinance imposes certain restrictions on the importation into Japan of dyestuffs and other coal tar derivatives of foreign manufacture. In general, the permission of the Minister of Agriculture and Commerce is required before coal tar dyestuffs and chemical products derived from coal tar distillates (except medicinal products and carbolic acid) may be imported into Japan, but when such articles are imported from the United Kingdom, France, or Italy, no import licence is necessary. Importers of dyes from these countries must, however, submit to the Customs authorities a statement giving certain particulars. Similar regulations have been promulgated in Korea.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

BONE CHARCOAL.—A firm of produce brokers in Montreal, desire the representation in Canada of manufacturers of bone charcoal, which should screen 14 by 30 and 16 by 30 to an inch. (Reference No. 453.)

CHEMICALS.—A firm of agents in Warsaw desires to secure the representation for Poland of British manufacturers of chemicals, chemico-technical, rubber, and surgical goods. (This is a repetition of a notice of September 11.) (Reference No. 449.)

GAS OIL.—Edinburgh Corporation invites tenders for supply of 500 tons of gas oil, suitable for use in carburetted water-gas plant, specific gravity from 850–870 degrees, delivery beginning from date of acceptance at the rate of 100 tons monthly. State price per gallon, including delivery in contractors' railway tank wagons within Granton gasworks. Tenders to Mr. A. Grierson, City Chambers, Edinburgh, before November 1.

CALCIUM CARBIDE, ETC.—The Great Northern Railway (Ireland) Co. invites tenders for calcium carbide for acetylene gas lighting, explosives, cement, plaster of paris, colours. Tender forms, 1s., from Mr. J. B. Stephens, Amiens Street Station, Dublin, before November 10.

A Substitute for Rubber

RECENT developments in a rubber substitute known as factice seem to indicate that its uses may be extended. Factice is manufactured from various kinds of vegetable oils, from rapeseed oil to corn oil, combined with sulphur chloride, says *The Manchester Guardian Commercial*. Subsequent treatment removes both the sulphur and the original oil, and the resulting product is used for waterproofing cloths and motor-car hoods. For this kind of product factice is economical, as it reduces the solvent necessary, such as benzol, coal tar and petrol, and permits more easy spreading on the cloth. Other uses for this rubber substitute include various hard rubber articles, bicycle tyres, where it is found possible to use as much as 20 per cent. in the side wall, and coverings for fire hose, conveyer bands, and belt frictions.

Traders and Exceptional Rates

THE Mansion House Association on Railway and Canal Traffic, which throughout the protracted proceedings of the Railway Rates Revision has taken an active part through its representatives in all the deliberations, had under consideration at its executive meeting on Monday, October 20, the important question of Exceptional Rates for Merchandise Traffic as provided for in the Railways Act, 1921. Negotiations with the railway companies are being continued, and it is hoped shortly that an arrangement satisfactory to all parties will be reached.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

Mortgages and Charges

[NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.]

ALFORD (R. W. T.), LTD., Bristol, manufacturers of veterinary medicines, etc. (M., 1/11/24.) Registered October 13, £1,200 debenture, to J. English and Co., Ltd., 108, Wellington Road, Forest Gate; general charge. *Nil. September 11, 1923.

ASHBY SOAPS, LTD., Derby. (M., 1/11/24.) Registered October 17, £1,000 debentures, part of £7,500; general charge.

NICHOLS CHEMICAL CO., LTD., Blackburn. (M., 1/11/24.) Registered October 16, charge to Bank; charged on chemical works, Lower Booths, near Accrington. *Nil. July 8, 1924.

Satisfaction

EDIBLE NUT OILS, LTD., London, E.C. (M.S., 1/11/24.) Satisfaction registered October 20, £50,000, registered June 9, 1922.

London Gazette, &c.

Company Winding Up Voluntarily

STEELS, LTD. (C.W.U.V., 1/11/24.) E. H. Palmer, chartered accountant, Bentinck Buildings, Wheeler Gate, Nottingham, appointed liquidator, October 6.

New Companies Registered

CAPSOL PRODUCTS, LTD., Sop Avenue, Blomfield Road, Blackpool. To acquire the business of domestic dye manufacturers carried on by Capsol Dyes, Ltd., and to carry on the said business and that of manufacturers of and dealers in bleaching and dyeing materials, sulphuric acid, and all kinds of salts, acids, alkalis, drugs etc. Nominal capital, £5,000 in £1 shares.

CHINA CLAY PRODUCERS, LTD., St. Austell, Cornwall.—Registered on October 20 as a company limited by guarantee and not having a share capital, with 100 members each liable for £10 in the event of winding up. The objects are: To ensure and accelerate the better distribution of supplies of china clay among the customers who purchase clay from members of the company; to co-operate with any china clay producers for their mutual benefit; to refine, crush, and prepare for market, search for, obtain, and get china clay of all kinds; to carry on business as miners, metallurgists, quarry owners, ship and barge owners, wharfingers, warehousemen, carriers, etc. The management is vested in a board.

MACFARLANE'S (LLANDUDNO), LTD. Wholesale and retail chemists and druggists. Nominal capital, £2,000 in £1 shares. Solicitor: E. E. Bone, Llewellyn Chambers, Llandudno.

NEWBALL AND MASON, LTD. Manufacturing and exporting chemists and distillers of essential oils and essences. Nominal capital, £60,000 in £1 shares (15,000 7 per cent. cumulative preference and 45,000 ordinary). Solicitor: J. A. Simpson, Parade Chambers, South Parade, Nottingham.

SMITH BROTHERS (BASINGSTOKE), LTD. Oil refiners; manufacturers of artificial manures and fertilisers; manufacturing chemists and druggists, etc. Nominal capital, £55,000 in £1 shares. Solicitor: H. W. Chandler, Basingstoke.

Action for Alleged Patent Infringement

Judgment for F. W. Berk & Co.

MR. JUSTICE TOMLIN in the Chancery Division on Thursday, October 30, gave judgment in an action by Dr. Meyer Wilderman against F. W. Berk and Co., Ltd., Fenchurch Avenue, E.C., for an injunction restraining them from, as he alleged, infringing his letters patent for an invention relating to "Improvements in Electrolytic Cells for the Electrolysis of Alkaline Salts."

The plaintiff, a Bermudian, complained that defendants imported caustic potash manufactured by the Deutsche Wilderman Werke, of Luelsdorf, Cologne, by apparatus which infringed his patent. Defendants denied infringement and said they knew nothing about plaintiffs' patent and that as plaintiff was resident and carrying on business in Germany when the purchases were made in 1919, the action was not maintainable because of the provisions of the Treaty of Peace.

His Lordship said that in the process of manufacture used by the Deutsche Wilderman Werke, there was employed a mechanical contrivance in the shape of a trough constructed with projections or noses similar to what was contained in the plaintiffs' specification. But it did not follow that the importation of potash made under these conditions was an infringement of the plaintiff's patent. He did not know what was the precise function of this contrivance in the making of electrolytic salts because no evidence on the point was called. He could not think that the employment of, for instance, a patented blow-pipe or a patented hammer employed in the making of some part of a locomotive would necessarily render the locomotive an infringement of the patent. Each case must be determined on its merits, but in this case he did not think that the plaintiff had proved, and he (the judge) was not prepared to hold, that the device which was the subject-matter of the invention was of such a character or was so used in relation to the manufacture of potash, as to render the importation of the potash an infringement of the patent.

As to the plaintiff's right to sue he held that the plaintiff could not, even if the alleged infringement was proved, maintain the action because (1) at the date of the alleged infringement the patent was vested in the Custodian of Enemy Property owing to the fact that at that time the plaintiff was a "hostile person" within the meaning of the phrase as defined in the vesting order; (2) that there was nothing in the language of the vesting order which transferred the right of action to the plaintiff; (3) that under Article 309 of the Treaty of Peace the plaintiff had acquired the character of a resident, in Germany, at the material date, and (4) that it had not been proved that the plaintiff had ever divested himself of that character.

He was satisfied that the defendants acted in good faith and were not aware of the existence of the patent. The action failed and must be dismissed with costs.

Removal of Pebbles from Clays

THE object of an investigation now being conducted at the ceramic experiment station of the U.S.A. Bureau of Mines, Columbus, Ohio, is to obtain and analyse suggestions and data on equipment and processes for treating clays containing pebbles. Suggestions and data are being obtained from published literature and by direct questionnaires to manufacturers using pebbly clays, and visits are being made to plants in the vicinity of Columbus to obtain detailed opinions of their operators. Laboratory work is being conducted on methods of treating clays containing particles of limestone to render the particles harmless.

A final study of the data compiled from the experiments on methods of treating clay containing lime particles showed that increased intensity or duration of firing was probably the most important consideration in rendering the particles harmless. The addition of from 0.5 per cent. to 1.5 per cent. of sodium chloride to the clay is noticeably effective in preventing the destructive action of the particles. Soaking of the test pieces prevents subsequent destructive expansion. Photographs are being taken at ten day intervals to record the progress of destruction and also photomicrographs are being taken of individual particles to show the cracks that occur in firing and also the cracks that later occur from expansion of the particle.

